INTER-AMERICAN TROPICAL TUNA COMMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

QUARTERLY REPORT—INFORME TRIMESTRAL

January-March 2009—Enero-Marzo 2009

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The

QUARTERLY REPORT

January-March 2009

of the

INTER-AMERICAN TROPICAL TUNA COMMISSION

is an informal account, published in English and Spanish, of the current status of the tuna fisheries in the eastern Pacific Ocean in relation to the interests of the Commission, and of the research and the associated activities of the Commission's scientific staff. The research results presented should be regarded, in most instances, as preliminary and in the nature of progress reports.

El

INFORME TRIMESTRAL

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de la

COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

es un relato informal, publicado en inglés y español, de la situación actual de la pesca atunera en el Océano Pacífico oriental con relación a los intereses de la Comisión, y de la investigación científica y demás actividades del personal científico de la Comisión. Gran parte de los resultados de investigación presentados en este informe son preliminares y deben ser considerados como informes del avance de la investigación.

Editor—Redactor:

William H. Bayliff

INTRODUCTION

The Inter-American Tropical Tuna Commission (IATTC) operates under the authority and direction of a convention originally entered into by Costa Rica and the United States. The convention, which came into force in 1950, is open to adherence by other governments whose nationals fish for tropical tunas and tuna-like species in the eastern Pacific Ocean (EPO). Under this provision Panama adhered in 1953, Ecuador in 1961, Mexico in 1964, Canada in 1968, Japan in 1970, France and Nicaragua in 1973, Vanuatu in 1990, Venezuela in 1992, El Salvador in 1997, Guatemala in 2000, Peru in 2002, Spain in 2003, the Republic of Korea in 2005, and Colombia in 2007. Canada withdrew from the IATTC in 1984.

The IATTC's responsibilities are met with two programs, the Tuna-Billfish Program and the Tuna-Dolphin Program.

The principal responsibilities of the Tuna-Billfish Program specified in the IATTC's convention were (1) to study the biology of the tunas and related species of the eastern Pacific Ocean to estimate the effects that fishing and natural factors have on their abundance and (2) to recommend appropriate conservation measures so that the stocks of fish could be maintained at levels that would afford maximum sustainable catches. It was subsequently given the responsibility for collecting information on compliance with Commission resolutions.

The IATTC's responsibilities were broadened in 1976 to address the problems arising from the incidental mortality in purse seines of dolphins that associate with yellowfin tuna in the EPO. The Commission agreed that it "should strive to maintain a high level of tuna production and also to maintain [dolphin] stocks at or above levels that assure their survival in perpetuity, with every reasonable effort being made to avoid needless or careless killing of [dolphins]" (IATTC, 33rd meeting, minutes: page 9). The principal responsibilities of the IATTC's Tuna-Dolphin Program are (1) to monitor the abundance of dolphins and their mortality incidental to purse-seine fishing in the EPO, (2) to study the causes of mortality of dolphins during fishing operations and promote the use of fishing techniques and equipment that minimize these mortalities, (3) to study the effects of different modes of fishing on the various fish and other animals of the pelagic ecosystem, and (4) to provide a secretariat for the International Dolphin Conservation Program, described below.

On 17 June 1992, the Agreement for the Conservation of Dolphins ("the 1992 La Jolla Agreement"), which created the International Dolphin Conservation Program (IDCP), was adopted. The main objective of the Agreement was to reduce the mortality of dolphins in the purse-seine fishery without harming the tuna resources of the region and the fisheries that depend on them. This agreement introduced such novel and effective measures as Dolphin Mortality Limits (DMLs) for individual vessels and the International Review Panel to monitor the performance and compliance of the fishing fleet. On 21 May 1998, the Agreement on the International Dolphin Conservation Program (AIDCP), which built on and formalized the provisions of the 1992 La Jolla Agreement, was signed, and it entered into force on 15 February 1999. In 2007 the Parties to this agreement consisted of Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, the United States, Vanuatu, and Venezuela, and Bolivia, Colombia, and the European Union were applying it provisionally. These were "committed to ensure the sustainability of tuna stocks in the eastern Pacific Ocean and to progressively reduce the incidental mortalities of dolphins in the tuna fishery of the eastern Pacific Ocean to levels approaching zero; to avoid, reduce and minimize the incidental catch and the discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem." This agreement established Stock Mortality Limits, which are similar to DMLs except that (1) they apply to all vessels combined, rather than to individual vessels, and (2) they apply to individual stocks of dolphins, rather than to all stocks of dolphins combined. The IATTC provides the Secretariat for the International Dolphin Conservation Program (IDCP) and its various working groups and panels and coordinates the On-Board Observer Program and the Tuna Tracking and Verification System (both described later in this report).

At its 70th meeting, on 24-27 June 2003, the Commission adopted the Resolution on the Adoption of the Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established by the 1949 Convention between the United States of America and the Republic of Costa Rica ("the Antigua Convention"). This convention will replace the original one 15 months after it has been ratified or acceded to by seven Parties that were Parties to the 1949 Convention on the date that the Antigua Convention was open for signature. It has been ratified or acceded to by Mexico on 14 January 2005, El Salvador on 10 March 2005, the Republic of Korea on 13 December 2005, the European Union on 7 June 2006, Nicaragua on 13 December 2006, Belize on 12 June 2007, Panama on 10 July 2007, France on 20 July 2007, and Japan on 11 July 2008. Of these, El Salvador, France, Japan, Mexico, Nicaragua, and Panama were Parties to the 1949 Convention on the data that the Antigua Convention was open for signature.

To carry out its responsibilities, the IATTC conducts a wide variety of investigations at sea, in ports where tunas are landed, and in its laboratories. The research is carried out by a permanent, internationally-recruited research and support staff appointed by the Director, who is directly responsible to the Commission.

The scientific program is now in its 57th year. The results of the IATTC staff's research are published in the IATTC's Bulletin and Stock Assessment Report series in English and Spanish, its two official languages, in its Special Report and Data Report series, and in books, outside scientific journals, and trade journals. Summaries of each year's activities are reported upon in the IATTC's Annual Reports and Fishery Status Reports, also in the two languages.

MEETINGS

Drs. Mark N. Maunder and Alexandre Aires-da-Silva participated in a Stock Synthesis (version 3) web-based conference at the Southwest Fisheries Science Center, La Jolla, California, USA, on 21-22 January 2009.

Mr. Kurt M. Schaefer participated at an Atlantic Innovation Fund (AIF) Project review meeting at Lotek Wireless, Inc., in St. John's, Newfoundland, Canada, on 29-30 January 2009. Lotek Wireless manufactures various types of electronic tags for studying the movements, behavior, and habitat utilization of aquatic and terrestrial animals. Mr. Schaefer has been working with Lotek on the development of various tags and utilizing its products with tropical tunas since about 2002. The meeting was attended by engineers and other staff members of Lotek, staff members of the Canadian National Research Council and the Canadian Department of Fisheries and Oceans, and two scientists from the International Pacific Halibut Commission. Lotek received a significant sum of money in 2007 from the AIF for a four-year project for the further refinement, development, and commercialization of archival tags for aquatic applications. The purpose of the meeting was to review and discuss the various active components of this project, including several new tags in development, miniaturization and significant increases in memory, and new environmental sensors. Mr. Schaefer's travel expenses were paid by Lotek.

Dr. Michael G. Hinton participated in a meeting of the Billfish Working Group of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific of the Western and Central Pacific Fisheries Commission in Honolulu, Hawaii, USA, on 3-10 February 2009. The principal topic of discussion was selection of data and preparation for an assessment of swordfish. Dr. Hinton presented a report on stock structure hypotheses for the assessment of striped marlin.

Drs. Mark N. Maunder and Alexandre Aires-da-Silva participated in a Stock Synthesis (version 3) workshop on tuna applications at the Southwest Fisheries Science Center, La Jolla, California, USA, on 13 February 2009.

Dr. Michael G. Hinton participated in a discussion of progress on work under a grant looking at potential uses of satellite data to assist in decision support processes in marine science at the University of Southern California, Los Angeles, California, USA, on 19 February 2009.

Drs. Guillermo A. Compeán and Martín A. Hall participated in the 28th session of the FAO Committee on Fisheries in Rome, Italy, on 2-5 March 2009.

Dr. Guillermo A. Compeán and Mr. Brian S. Hallman participated in the second meeting of the Regional Fishery Body Secretariats Network in Rome, Italy, on 9-11 March 2009.

Dr. Mark N. Maunder participated in a Steering Committee Meeting of the AD Model Builder project at the National Center for Ecological Analysis and Synthesis, University of California at Santa Barbara, USA, on 11 March 2009.

Dr. Michael D. Scott was an invited participant at an international Cetacean Tag Design Workshop held in Arlington, Virginia, USA, on 16-17 March 2009. The purposes of the workshop were to review recent radiotag designs and attachments and to produce guidelines for future tagging studies. The workshop and the participants' expenses were paid by the U.S. Office of Naval Research.

Mr. Brian S. Hallman participated in the eighth round of the informal consultations of states party to the United Nations Fish Stocks Agreement, which took place at the United Nations headquarters in New York City, USA, on 16-19 March 2009.

The first meeting of the executive committee of the Proyecto de Cooperación para la Reducción de la Captura Incidental de Tortugas Marinas en el Océano Pacífico Oriental was held in La Jolla, California, USA, on 18-19 March 2009. Drs. Guillermo A. Compeán and Martín A, Hall and Messrs. Ernesto Altamirano N. and Nickolas W. Vogel of the IATTC and Mr. Yasuhiro Horinouchi and three other representatives of the Overseas Fishery Cooperation Foundation of Japan participated in the meeting. On 19 March, Dr. Compeán and Mr. Horinouchi signed a

Memorandum of Understanding regarding continuation of the cooperative work on sea turtles being conducted by the two organizations.

DATA COLLECTION

The IATTC had field offices at Las Playas and Manta, Ecuador; Manzanillo and Mazatlan, Mexico; Panama, Republic of Panama; Mayaguez, Puerto Rico, USA; and Cumaná, Venezuela, during the first quarter of 2009.

Personnel at these offices collected 203 length-frequency samples from 152 wells and abstracted logbook information for 332 trips of commercial fishing vessels during the first quarter of 2009.

Also during the first quarter members of the field office staffs placed IATTC observers on 133 fishing trips by vessels that participate in the AIDCP On-Board Observer Program. In addition, 100 IATTC observers completed trips during the quarter, and were debriefed by field office personnel.

Surface fleet and surface catch statistics

Statistical data are continuously being collected by personnel at the IATTC's field offices and processed at its headquarters in La Jolla. As a result, estimates of fisheries statistics with varying degrees of accuracy and precision are available, the most accurate and precise being those made after all available information has been entered into the data base, processed, and verified. The estimates for the current quarter are the most preliminary, while those made six months to a year after monitoring of the fishery are much more accurate and precise. While it may require a year or more to obtain some final information, much of the catch information is processed and available within two to three months of the return of a vessel from a fishing trip.

Fleet statistics

The estimated total carrying capacity of the purse-seine and pole-and-line vessels that are fishing, or are expected to fish, in the eastern Pacific Ocean (east of 150°W; EPO) during 2009 is about 228,200 cubic meters (m^3) (Table 1). The weekly average at-sea capacity for the fleet, for the weekly periods ending January 1 through March 29, was about 141,000 m^3. The changes of flags and vessel names and additions to and deletions from the IATTC's fleet list during that period are given in Table 2.

Catch statistics

Catch statistics for the first quarter of 2009

The estimated total retained catches of tunas in the EPO during the report period, in metric tons, were:

Species	2009	2004-2008			Weekly average, 2009
		Average	Minimum	Maximum	
Yellowfin	59,600	69,000	52,600	91,400	5,000
Skipjack	71,300	69,300	51,600	93,100	5,900
Bigeye	9,300	11,900	8,500	15,500	800

Summaries of the preliminary estimated retained catches, by flag of vessel, are shown in Table 3.

Catch statistics for 2008

Estimates of the annual retained and discarded catches of the various species of tunas and other fishes by purse seiners and pole-and line vessels fishing at least part of the year in the EPO for yellowfin, skipjack, bigeye, or bluefin during 1979-2008 are shown in Table 4. The retained catch data for skipjack and bluefin are essentially complete except for insignificant catches made by the longline, recreational (for skipjack), and artisanal fisheries. The catch data for yellowfin and bigeye do not include catches by longline vessels, as the data for these fisheries are received much later than those for the surface fisheries. About 5 to 10 percent of the total catch of yellowfin is taken by longlines. Until recently, the great majority of the catch of bigeye had been harvested by the longline fishery.

There were no restrictions on fishing for tunas in the EPO during 1980-1997. However, there were restrictions on fishing for yellowfin in the Commission's Yellowfin Regulatory Area (CYRA) (IATTC Annual Report for 2001: Figure 1) from 26 November through 31 December 1998, from 14 October through 31 December 1999, from 1 through 31 December 2000, and from 27 October through 31 December 2001. Purse-seine fishing for tunas was prohibited in the EPO from 1 through 31 December 2002, and in a portion of the EPO from 1 through 31 December 2003. In 20042007, there were restrictions on purse-seine fishing for tunas for vessels of some countries from 1 August through 11 September, and from 20 November through 31 December for vessels of other countries. The members of the IATTC could not agree on regulations for 2008, but most of the countries adopted regulations similar to those that they had had during 2007. In addition, fishing for tunas associated with fish-aggregating devices (FADs) was prohibited in the EPO from 9 November through 31 December 1999 and from 15 September through 15 December 2000. Furthermore, regulations placed on purse-seine vessels directing their effort at tunas associated with dolphins have probably affected the way these vessels operate, especially since the late 1980s. There was a major El Niño event, which began in mid-1982 and persisted until late 1983. The catch rates in the EPO were low before and during this El Niño episode, which caused a shift of fishing effort from the eastern to the western Pacific, and the fishing effort remained relatively low during 1984-1986. During 1997-1998 another major El Niño event occurred in the EPO, but the effects of this on the vulnerability of the fish to capture were apparently less severe.

The retained catches, in metric tons, based on the current species composition project, described in the IATTC Annual Report for 2000 and in IATTC Stock Assessment Report 4, of yellowfin, skipjack, and bigeye in the EPO during 2008, the 1993-2007 annual averages for yellowfin and skipjack, and the 1994-2007 annual average for bigeye are as follows:

Species	2008	Average	Minimum	Maximum
			1993-2007	
Yellowfin	186,658	267,065	167,016	413,457
Skipjack	296,029	180,583	73,366	297,843
			1994-2007	
Bigeye	75,653	56,421	34,899	94,640

The 2008 catch of yellowfin was about 80 thousand metric tons (t) (30 percent) less than the average for 1993-2007. The 2008 skipjack catch was about 115 thousand t (64 percent) greater than the average for 1993-2007. The 2008 bigeye catch was about 20 thousand t (36 percent) greater than the average for 1994-2007.

The average annual distributions of the logged retained purse-seine catches of yellowfin, skipjack, and bigeye, by set type, in the EPO during the 1998-2007 period are shown in Figures 1a, 2a, and 3a, and the preliminary estimates for 2008 are shown in Figures 1b, 2b, and 3b. The amounts of yellowfin caught in association with dolphins off Mexico and Central America have been significantly lower during the past several years. The catch of yellowfin off northern South America in 2008 was also less than the average of 1998-2007. Large catches of skipjack were taken in unassociated schools around the Galapagos Islands and in the inshore area off northern South America in 2008. Large amounts of skipjack were also caught in sets on fish associated with floating objects near the equator east of 110°W and between the equator and 10°S west of 140°W during 2008. Bigeye are not often caught north of about 7°N. The catches of bigeye have decreased in the inshore areas off South America for many years. With the development of the fishery for tunas associated with FADs, the relative importance of the inshore areas has decreased, while that of the offshore areas has increased. Most of the bigeye catches are taken from schools associated with FADs between 5°N and 5°S.

While yellowfin, skipjack, and bigeye comprise most of the catches of fish made by tuna vessels in the EPO, bluefin, albacore, bonito, black skipjack, and other species contribute to the overall harvest in this area. The total retained catch of these other species in the EPO was about 15 thousand t in 2008 (Table 4), which is considerably greater than the 1993-2007 annual average retained catch of about 4 thousand t (range: 500 t to 19 thousand t). The increase was due mainly to increased catches of bonito by Mexican vessels (Table 5).

Preliminary estimates of the retained catches in the EPO in 2008, by flag, and the landings of EPO-caught fish, by country, are given in Table 5. The landings are fish unloaded during a calendar year, regardless of the year of catch. The country of landing is that in which the fish were unloaded from the fishing vessel or, in the case of transshipments, the country that received the transshipped fish.

Preliminary estimates of the most significant (equal to or greater than about 5 percent of the total) retained catches and landings, of all species combined, during 2008 were as follows:

Flag	Retained catches		Landings	
	Metric tons	Percentage	Metric tons	Percentage
Colombia	-	-	59,100	10
Ecuador	204,200	36	301,200	53
Mexico	122,600	21	127,600	22
Panama	81,100	14	-	-
Venezuela	51,400	9	23,900	4

It is important to note that when final information is available the landings currently assigned to the various countries may change due to exports from storage facilities to processors in other nations.

Catch statistics for the longline fishery

The catches of bigeye by longline gear in the EPO during 2008 and the first quarter of 2009 are shown in Tables 6a and 6b, respectively. Equivalent data are not available for the other species of tunas, or for billfishes.

Size compositions of the surface catches of tunas

Length-frequency samples are the basic source of data used for estimating the size and age compositions of the various species of fish in the landings. This information is necessary to obtain age-structured estimates of the population for various purposes, including the integrated modeling that the staff has employed during the last several years. The results of such studies have been described in several IATTC Bulletins, in its Annual Reports for 1954-2002, and in its Stock Assessment Reports.

Length-frequency samples of yellowfin, skipjack, bigeye, Pacific bluefin, and, occasionally, black skipjack from the catches of purse-seine, pole-and-line, and recreational vessels in the EPO are collected by IATTC personnel at ports of landing in Ecuador, Mexico, Panama, the USA, and Venezuela. The catches of yellowfin and skipjack were first sampled in 1954, bluefin in 1973, and bigeye in 1975. Sampling has continued to the present.

The methods for sampling the catches of tunas are described in the IATTC Annual Report for 2000 and in IATTC Stock Assessment Report 4. Briefly, the fish in a well of a purse-seine or pole-and-line vessel are selected for sampling only if all the fish in the well were caught during the same calendar month, in the same type of set (floating-object, unassociated school, or dolphin), and in the same sampling area. These data are then categorized by fishery (Figure 4).

Data for fish caught during the fourth quarter of 2003-2008 are presented in this report. Two sets of length-frequency histograms are presented for each species; the first shows the data by stratum (gear type, set type, and area) for the fourth quarter of 2008, and the second shows the combined data for the fourth quarter of each year of the 2003-2008 period. Samples from 204 wells were taken during the fourth quarter of 2008. No samples were taken from the negligible catches of yellowfin and skipjack taken by pole-and-line vessels during the fourth quarter. The estimates of the size distributions of these catches were obtained by using length-frequency data from fish caught in unassociated schools by purse seiners.

There are ten surface fisheries for yellowfin defined for stock assessments: four associated with floating objects, two unassociated school, three associated with dolphins, and one pole-and-line (Figure 4). The last fishery includes all 13 sampling areas. Of the 204 wells sampled, 124 contained yellowfin. The estimated size compositions of these fish during the fourth quarter of 2008 are shown in Figure 5a. Substantial amounts of yellowfin were caught in sets on fish associated with dolphins, and lesser amounts on fish associated with floating objects, and sets on unassociated schools during the fourth quarter. Most of the yellowfin taken in floating-object sets were about 40 to 80 cm in length. Small amounts of smaller yellowfin were also captured in the Northern and Southern unassociated fishing areas and in the Inshore dolphin fishing area. Larger fish (>100 cm) were taken in the unassociated fishery in the South, and in the dolphin fisheries in the Northern, Southern, and Inshore areas.

The estimated size compositions of the yellowfin caught by all fisheries combined during the fourth quarter of 2003-2008 are shown in Figure 5b. The average weights of the yellowfin caught during the fourth quarter of 2008 were considerably greater than those of the 2004 to 2007 period but less than those of the fish caught during 2003.

There are eight fisheries for skipjack defined for stock assessments: four associated with floating objects, two unassociated school, one associated with dolphins, and one pole-and-line (Figure 4). The last two fisheries include all 13 sampling areas. Of the 204 wells sampled, 158 contained skipjack. The estimated size compositions of these fish during the fourth quarter of 2008 are shown in Figure 6a. The catches of skipjack continued to be good in the floating-object fishery in the Equatorial and Southern regions, and in the Southern unassociated area. Lesser amounts of skipjack were caught in the Northern and Inshore floating-object fisheries, and in the Northern unassociated fishery. Small amounts of skipjack were taken in the dolphin fisheries.

The estimated size compositions of the skipjack caught by all fisheries combined during the fourth quarter of 2003-2008 are shown in Figure 6b. The majority of the skipjack caught during the fourth quarter ranged between about 40 and 70 cm. The average weight of the fish caught during 2008 was greater than those of the fish caught during 2007, but less than those caught during 2003 and 2006.

There are seven surface fisheries for bigeye defined for stock assessments: four associated with floating objects, one unassociated school, one associated with dolphins, and one pole-and-line (Figure 4). The last three fisheries include all 13 sampling areas. Of the 204 wells sampled, 48 contained bigeye. The estimated size compositions of these fish during the fourth quarter of 2008 are shown in Figure 7a. During the fourth quarter the bigeye catches were high in the Northern and Southern floating-object fisheries, and much less in the Equatorial floating-object fishery and in the unassociated fishery. Negligible amounts of bigeye were caught in the Inshore floating-object fishery. No catches of bigeye in dolphin sets or by pole-and-line vessels during the fourth quarter were recorded.

The estimated size compositions of the bigeye caught by all fisheries combined during the fourth quarter of 2003-2008 are shown in Figure 7b. The average weight of bigeye caught during the fourth quarter of 2008 was considerably less than those of any year of the 2003-2007 period.

Observer program

Coverage

The Agreement on the International Dolphin Conservation Program (AIDCP) requires 100-percent coverage by observers on trips by purse seiners with carrying capacities greater than 363 metric tons that fish for tunas in the eastern Pacific Ocean (EPO). This mandate is carried out by the AIDCP On-Board Observer Program, made up of the IATTC's international observer program and the observer programs of Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, and Venezuela. The observers are biologists trained to collect a variety of data on the mortalities of dolphins associated with the fishery, sightings of dolphin herds, catches of tunas and bycatches of fish and other animals, oceanographic and meteorological data, and other information used by the IATTC staff to assess the conditions of the various stocks of dolphins, study the causes of dolphin mortality, and assess the effect of the fishery on tunas and other components of the ecosystem. The observers also collect data relevant to compliance with the provisions of the AIDCP, and data required for the tuna-tracking system established under the AIDCP, which tracks the "dolphin-safe" status of tuna caught in each set from the time it is captured until it is unloaded (and, after that, until it is canned and labeled).

In 2009 the observer programs of Colombia, the European Union, Mexico, Nicaragua, Panama, and Venezuela are to sample half, and that of Ecuador approximately one-third, of the trips by vessels of their respective fleets, while IATTC observers are to sample the remainder of those trips. Except as described in the next paragraph, the IATTC is to cover all trips by vessels registered in other nations that are required to carry observers.

At the fifth meeting of the Parties to the AIDCP in June 2001, observers from the international observer program of the South Pacific Forum Fisheries Agency (FFA) were approved to collect pertinent information for the On-Board Observer Program, pursuant to Annex II (9) of the AIDCP in cases for which the Director determines that the use of an observer from the AIDCP On-Board Observer Program is not practical.

Observers from the On-Board Observer Program departed on 229 fishing trips aboard purse seiners covered by that program during the first quarter of 2009. Preliminary coverage data for these vessels during the quarter are shown in Table 7.

Training

There were no IATTC observer training courses conducted during the quarter.

RESEARCH

Tuna tagging

Two IATTC staff members spent the period of 11-25 February 2009, aboard the 28-m, long-range, sport-fishing vessel *Royal Star*, which made a trip to the Revillagigedo Islands Marine Reserve, Mexico, for the purpose of tagging yellowfin tuna and wahoo. The tagging project is a collaborative effort between the IATTC, the Instituto Nacional de Pesca of Mexico, and the owners of the *Royal Star*. The permit, obtained from the government of Mexico for this project, provides a unique opportunity to conduct a comprehensive scientific evaluation of the movements and behavior of yellowfin tuna and wahoo within the Revillagigedo Islands Marine Reserve and in areas to which the fish might move, through no-retention tag-and-release fishing trips aboard the *Royal Star*. The cruise was highly successful, as 557 yellowfin were brought aboard the boat, measured, tagged with conventional plastic dart tags, and released, and an additional 11 yellowfin were brought alongside the boat, tagged in the water with plastic intramuscular tags, and released. (Intramuscular tags are applied, with tagging poles, in the water, which reduces the stress to the fish, but makes it infeasible to measure them.) Of these 568 fish, 162 weighed between 100 and 200 pounds (45 and 91 kg) and 12 weighed more than 200 pounds (91 kg). An additional 21 yellowfin were brought aboard the boat, measured, tagged with archival tags, and released (5 at Isla San Benedicto, 5 at Isla Socorro, 5 at Roca Partida, and 6 at Isla Clarion). In addition, 79 wahoo, most weighing about 10 to 20 kg, were tagged in the water with plastic intramuscular tags and released.

Early life history studies

Yellowfin broodstock

The yellowfin broodstock in Tank 1 (1,362,000 L) at the Achotines Laboratory spawned daily during the quarter through March 2. After that, there was no spawning for the remainder of the quarter. Spawning occurred between 9:00 p.m. and 10:46 p.m. The numbers of eggs collected after each spawning event ranged from about 1,000 to 605,000. The water temperatures in the tank during the quarter ranged from 21.4° to 27.3°C.

There were three 49- to 60-kg yellowfin and seven 17- to 24-kg yellowfin in Tank 1 at the end of March.

In late January 2007, 10 yellowfin (4 to 10 kg) held in the 170,000-L reserve broodstock tank (Tank 2) were implanted with prototype archival tags and transferred to Tank 1. Another 15 reserve-broodstock yellowfin held in Tank 2 were transferred to Tank 1 during late 2008; 5 of the October-stocked fish and 1 of the December-stocked fish were implanted with archival tags before they were moved to Tank 1. At the end of March, two of the January 2007 group and three of the October 2008 group, all bearing archival tags, remained in Tank 1.

Rearing of yellowfin eggs, larvae, and juveniles

During the quarter the following parameters were recorded for most spawning events: times of spawning, egg diameter, duration of egg stage, hatching rate, lengths of hatched larvae, and duration of yolk-sac stage. The weights of the eggs, yolk-sac larvae, and first-feeding larvae, and the lengths and selected morphometrics of these, were measured periodically.

Studies of snappers

The work on spotted rose snappers (*Lutjanus guttatus*) is carried out by the Autoridad de los Recursos Acuáticos de Panamá (ARAP).

During 2008 two separate broodstocks of snappers were combined in Tank 3 (85,000 L). These fish consisted of individuals originally captured as broodstock in 1996 and of individuals bred from spawning during 1998. These fish spawned only twice this quarter, both times during March.

A new population of mature snappers was stocked in Tank 4 (85,000 L) during mid-2008. These fish have not yet spawned.

Visitors at the Achotines Laboratory

Dr. Harilaos Lessios, a Senior Scientist at the Smithsonian Tropical Research Institute (STRI), spent the period of 14-16 January 2009 at the Achotines Laboratory. Dr. Lessios was accompanied by two STRI post-doctoral students, Dr. Alexandra Hiller, who is investigating porcelain crabs, and Dr. Simon Coppard, who is studying sand dollars.

Mr. Makoto Misawa, the Japanese Ambassador to Panama, visited the Achotines Laboratory on 10 February 2009. He was accompanied by Mrs. Misawa and the First Secretary of the Embassy, Dr. Shigemi Hatakeda.

During their travels to fishing cooperatives along the Pacific coast of Panama, Dr.Martín Hall, Dr. Mitsuhashi Takahisa of the Overseas Fishery Cooperation Foundation (OFCF) of Japan, and a member of the staff of the Autoridad de los Recursos Acuáticos de Panamá (ARAP), spent the period of 10-11 February 2009 at the Achotines Laboratory.

Dr. Glenn Adelson of Brandeis University, Waltham, Massachusetts, USA, and 18 of his students spent the period of 12-15 February 2009 at the Achotines Laboratory, where he taught a portion of his Terrestrial Restoration Ecology course.

Dr. Gidon Minkoff and Mr. Oryel Moussaieff of Global Royal Fish (GRF), accompanied by Ms. Karla Adames and Mr. José Gonzalez of ARAP, spent the period of 12 February-1 March, 2009, at the Achotines Laboratory. During their stay they met with members of the Achotines Laboratory staff to discuss and plan joint IATTC-GRF research activities.

Dr. Stephen W. Pacala, Frederick D. Petrie Professor in the Department of Ecology and Evolutionary Biology at Princeton University, Princeton, New Jersey, USA, taught a portion of his "Biology of Coral Reefs" field course to 21 students at the Achotines Laboratory during the period of 9-11 March 2009.

Drs. Hillel Gordin and Ariel Diamant of Israel Oceanographic and Limnological Research, Mr. Hagay Sarusi of the Israeli aquaculture company Aqua-Group Initiatives, Dr. Micha Peled of Star-Kist Food d'Or of Israel, and Ms. Roxana Castillo of ARAP visited the Achotines Laboratory on 16-17 March 2009. During their visit they discussed plans for joint research activities to be carried out at the Achotines Laboratory under the Memorandum of Understanding between the IATTC and the GRF described in the section entitled **INTER-AGENCY COOPERATION**.

Dr. Jefferson Hall, Director of the Proyecto de Reforestación con Especies Nativas (PRORENA) spent the period of 17-19 March 2009 at the Achotines Laboratory while visiting

PRORENA study sites in the area. Dr. Hall was accompanied by Dr. Michiel van Breugel, an STRI Postdoctoral Fellow, who will be involved in PRORENA research in the Achotines Forest area.

Dr. Alex Finkral and 12 undergraduate students of the School of Forestry, Northern Arizona University, Flagstaff, Arizona, USA, spent the period of 17-18 March 2009 at the Achotines Laboratory, where they looked at the Achotines Forest Reserve and PRORENA planting sites in the area.

Dr. Matthew J. Miller, a STRI Postdoctoral Fellow, spent the period of 21-25 March 2009 at the Achotines Laboratory, where he performed a mini-ornithological survey in the local dry forest. His goals were to satisfy national surveying objectives with regard to avian influenza monitoring and the DNA barcodes of the Birds of Panama project.

Dr. Gidon Minkoff, an aquaculture consultant to the GRF, arrived at the Achotines Laboratory on March 25, to plan upcoming research activities and infrastructure upgrades for the Achotines Laboratory and to prepare for joint research trials with yellowfin tuna larvae.

Oceanography and meteorology

Easterly surface winds blow almost constantly over northern South America, which cause upwelling of cool, nutrient-rich subsurface water along the equator east of 160ºW, in the coastal regions off South America, and in offshore areas off Mexico and Central America. El Niño events are characterized by weaker-than-normal easterly surface winds, which cause above-normal sea-surface temperatures (SSTs) and sea levels and deeper-than-normal thermoclines over much of the tropical eastern Pacific Ocean (EPO). In addition, the Southern Oscillation Indices (SOIs) are negative during El Niño episodes. (The SOI is the difference between the anomalies of sea-level atmospheric pressure at Tahiti, French Polynesia, and Darwin, Australia. It is a measure of the strength of the easterly surface winds, especially in the tropical Pacific in the Southern Hemisphere.) Anti-El Niño events, which are the opposite of El Niño events, are characterized by stronger-than-normal easterly surface winds, below-normal SSTs and sea levels, shallower-than-normal thermoclines, and positive SOIs. Two additional indices, the NOI* (Progress Ocean., 53 (2-4): 115-139) and the SOI*, have recently been devised. The NOI* is the difference between the anomalies of sea-level atmospheric pressure at the North Pacific High (35°N-130°W) and Darwin, Australia, and the SOI* is the difference between the anomalies of sea-level atmospheric pressure at the South Pacific High (30°S-95°W) and Darwin. Ordinarily, the NOI* and SOI* values are both negative during El Niño events and positive during anti-El Niño events.

An area of warm water that had existed north and northwest of the Hawaiian Islands during the fourth quarter of 2007 persisted throughout the first and second quarters of 2008, but disappeared after that. Another area of warm water appeared south of 20°S between about 90° and 140°W in January 2008, and moved westward during the subsequent months. An area of warm water appeared off South America south of 20°S in February, increased in size in March (IATTC Quarterly Report for January-March 2008: Figure 8), and then decreased in size and eventually disappeared by June (IATTC Quarterly Report for April-June 2008: Figure 8). Meanwhile, the area of cool water that had extended along the equator from the coast of South

America to as far west as 180° during most of 2007 began to dissipate. However, the small area of cool water that was noted off Baja California in December 2007 expanded westward in January 2008, connecting with the area of cool water along the equator, and that connection persisted in February and March (IATTC Quarterly Report for January-March 2008: Figure 8). This area of cool water gradually dissipated during the second quarter of 2008, and was confined to waters north of 5°N by June (IATTC Quarterly Report for April-June 2008: Figure 8). The small area of warm water that had appeared along the equator east of 100°W in March (IATTC Quarterly Report for January-March 2008: Figure 8) persisted throughout the second and third quarters. It extended as far west as about 150°W in July, but had retreated to about 115°W by September (IATTC Quarterly Report for July-September 2008: Figure 5). The SSTs were near normal throughout the fourth quarter of 2008, with only a few scattered areas, mostly small, of warm or cool water (IATTC Quarterly Report for October-December 2008: Figure 6). A band of cool water formed along the equator from about 110°W to about 180° in January 2009. It weakened in February, but then became stronger in March, extending from the coast to about 140°W (Figure 8). It can be seen in Table 8 that all of the SST values for the fourth and first quarters were below normal, that the SOI* and NOI* indices, with one exception, were well above normal during the fourth and first quarters, and that the thermocline was very shallow in the equatorial eastern Pacific Ocean from December through March, all of which are indicative of anti-El Niño conditions. (However, the SOI indices were close to normal from October through March, and the charts from which Figure 8 was taken and the equivalent charts for October 2008 through February 2009 indicate, for the most part, near-normal conditions.) According to the Climate Diagnostics Bulletin of the U.S. National Weather Service for March 2009, "Several models indicate [that anti-El Niño conditions] will continue through March-May 2009. Based on current observations, recent trends, and model forecasts, a transition to … neutral conditions is expected during April 2009."

GEAR PROJECT

During the first quarter IATTC staff members participated in dolphin safety-gear inspections and safety-panel alignment procedures aboard four Mexican-flag purse-seiners.

COLLECTION OF AT-SEA AND SUPPLEMENTAL RETAINED CATCH DATA FOR SMALL PURSE SEINERS

The U.S. National Oceanic and Atmospheric Administration has awarded the IATTC a contract to place observers, on a voluntary basis, on sufficient numbers of trips of "Class-5" purse seiners (vessels with carrying capacities of 273-363 metric tons) based in ports on the Pacific Coast of Latin America to obtain data on "catch, bycatch, interaction with protected species, and gear" for 1,000 days at sea per year and to "sample 100 percent of the in-port unloadings of Class 4-5 purse seine vessels [vessels with well capacities of 182-363 metric tons]." If that is not possible, observers can be placed on sufficient numbers of trips of Class-3 and/or -4 vessels (vessels with well capacities of 92-272 metric tons) to bring the total numbers of days at sea observed to 1,000.

No observers were placed on vessels during the first quarter of 2009. The numbers of trips completed, numbers of samples taken, and numbers of fish sampled were as follows:

Month	Trips completed	Samples taken	Fish sampled		
			Yellowfin	Skipjack	Bigeye
January	15	12	2,260	750	150
February	25	22	842	1,322	-
March	23	21	2,517	1,550	75
Total	63	55	5,619	3,622	225

INTER-AGENCY COOPERATION

Drs. Martín A. Hall and Alexandre Aires-da-Silva participated in the "Reunión Centroamericana de Coordinación del Plan Piloto Regional de Monitoreo de Desembarques de Tiburones, Rayas y Neonatos de Tiburones" in San Salvador, El Salvador, on 25-27 February 2009. The meeting was organized by the Organización del Sector Pesquero y Acuícola del Istmo Centroamericano. In addition, Drs. Hall and Aires-da-Silva gave an introductory course in sampling statistics.

Dr. Guillermo Compeán and Mr. Alex Muhlholzl of Oceanic Tuna Limited (OTL) of the United Kingdom signed a Memorandum of Understanding (MOU) between the two organizations on 26 February 2009. The MOU provides a framework for the development of collaborative research between the IATTC and OTL on the use of prototype tank technologies designed to improve survival and growth of juvenile tunas.

Dr. Guillermo Compeán and Mr. Yoram Moussaief, president of Global Royal Fish (GRF), signed a MOU between the two organizations on 27 February 2009. GRF is a Panamanian company undertaking a multi-year research program on the captive spawning and rearing of yellowfin tuna. GRF is also collaborating on research with the Autoridad de los Recursos Acuáticos de Panama (ARAP) and the Israel Oceanographic and Limnological Research National Center for Mariculture (IOLR). The MOU will facilitate collaborative research conducted at the Achotines Laboratory on the reproductive biology and early life history of yellowfin tuna.

Dr. Mark N. Maunder, in collaboration with Drs. Anders Nielsen (Technical University of Denmark) and Johnoel Ancheta (Pelagic Fisheries Research Program, University of Hawaii), taught a two-day course on AD Model Builder at the National Center for Ecological Analysis and Synthesis, University of California at Santa Barbara, USA, on 9-10 March 2009.

Dr. Guillermo Compeán and Mr. Yasuhiro Horinouchi of the Overseas Fishery Cooperation Foundation of Japan signed of Memorandum of Understanding regarding continuation of the cooperative work on sea turtles being conducted by the two organizations on 19 March 2009.

Dr. Yoshifumi Sawada of Kinki University met with Dr. Daniel Margulies and Mr. Vernon P. Scholey on 23-25 March 2009 to discuss an impending IATTC-Kinki University Memorandum of Understanding and the research schedule for studies of yellowfin tuna during 2009. Dr. Sawada then met with Dr. Guillermo Compeán, Mr. Brian Hallman, Dr. Richard Deriso, Dr. Daniel Margulies, Ms. Jeanne Wexler, and Ms. Maria Santiago on 27 March 2009 to discuss the Proposal of Collaborative Research by the Kinki University Global Center of Excellence and the IATTC.

PUBLICATIONS

Maunder, Mark N., Jon T. Schnute, and James N. Ianelli. 2009. Computers in fisheries population dynamics. *In* Megrey, Bernard A., and Erlend Moksness (editors), Computers in Fisheries Research, Second edition. Springer: 337-372.

Scott, Michael D., and Susan J. Chivers. 2009. Movements and diving behavior of pelagic spotted dolphins. Mar. Mammal Sci., 25 (1): 137-160.

Wang, Sheng-Ping, Mark N. Maunder, and Alexandre Aires-da-Silva. 2009. Implications of model and data assumptions: an illustration including data for the Taiwanese longline fishery into the eastern Pacific Ocean bigeye tuna (*Thunnus obesus*) stock assessment. Fish. Res., 97 (1-2): 118-126.

Wells, Randall S., and Michael D. Scott. 2009. Common bottlenose dolphins (*Tursiops truncatus*). *In* Perrin, William F., J. G. M. Thewissen, and Bernd Wursig (editors), Encyclopedia of Marine Mammals, Second edition. Academic Press: 249-255.

ADMINISTRATION

Ms. Martha Arias, bilingual secretary for the Tuna-Dolphin section since August 2005, resigned effective 31 January 2009.

Ms. Mary Carmen López was hired as a replacement for Ms. Arias on 26 January 2009. Ms. López studied Communication at the Universidad Iberoamericana in Mexico City, focusing on the areas of organization and education. She had worked as a temporary secretary for the Tuna-Dolphin section in 2008, so she will be an effective replacement for Ms. Arias.

Ms. Maria Santiago received a promotion to assistant scientist on 1 February 2009.

Dr. Mihoko Minami of the Institute of Statistical Mathematics, Tokyo, Japan, who had been working with Dr. Cleridy Lennert-Cody since April 2008 on several projects, including trend estimation for bycatch data with zero-inflated models and development of dimension reduction methods for high-dimensional non-normal data, such as catch-bycatch species and size data, returned to Japan on 21 March 2009.

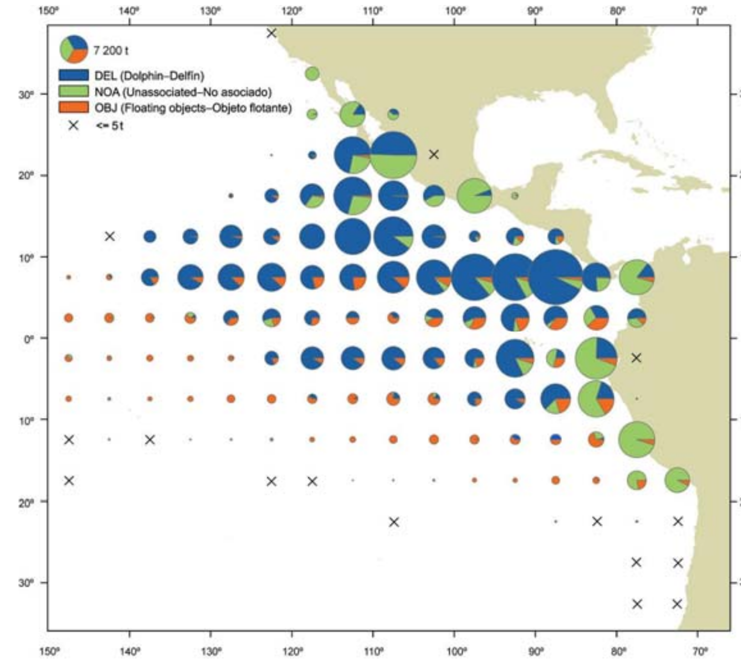

FIGURE 1a. Average annual distributions of the purse-seine catches of yellowfin, by set type, 1998-2007. The sizes of the circles are proportional to the amounts of yellowfin caught in those 5° by 5° areas.
FIGURA 1a. Distribución media anual de las capturas cerqueras de aleta amarilla, por tipo de lance, 1998-2007. El tamaño de cada círculo es proporcional a la cantidad de aleta amarilla capturado en la cuadrícula de 5° x 5° correspondiente.

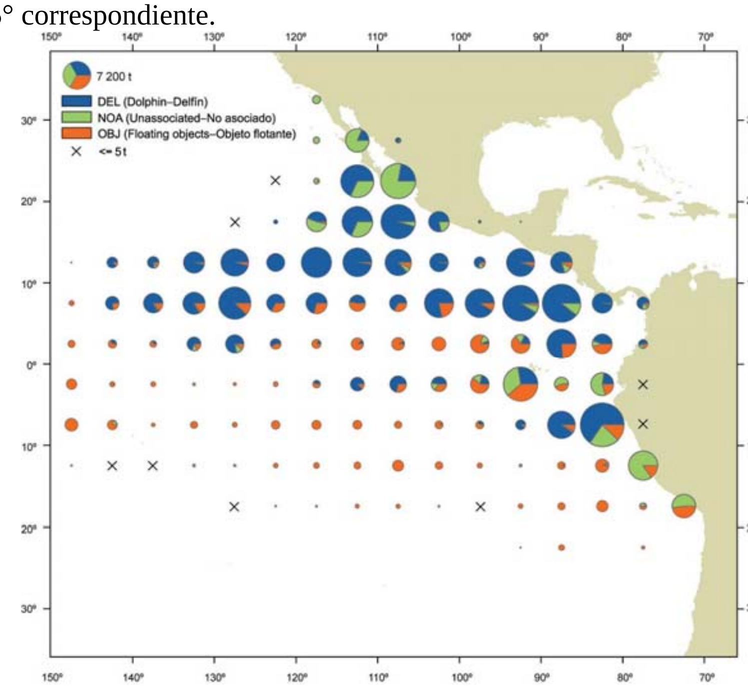

FIGURE 1b. Annual distributions of the purse-seine catches of yellowfin, by set type, 2008. The sizes of the circles are proportional to the amounts of yellowfin caught in those 5° by 5° areas.
FIGURA 1b. Distribución anual de las capturas cerqueras de aleta amarilla, por tipo de lance, 2008. El tamaño de cada círculo es proporcional a la cantidad de aleta amarilla capturado en la cuadrícula de 5° x 5° correspondiente.

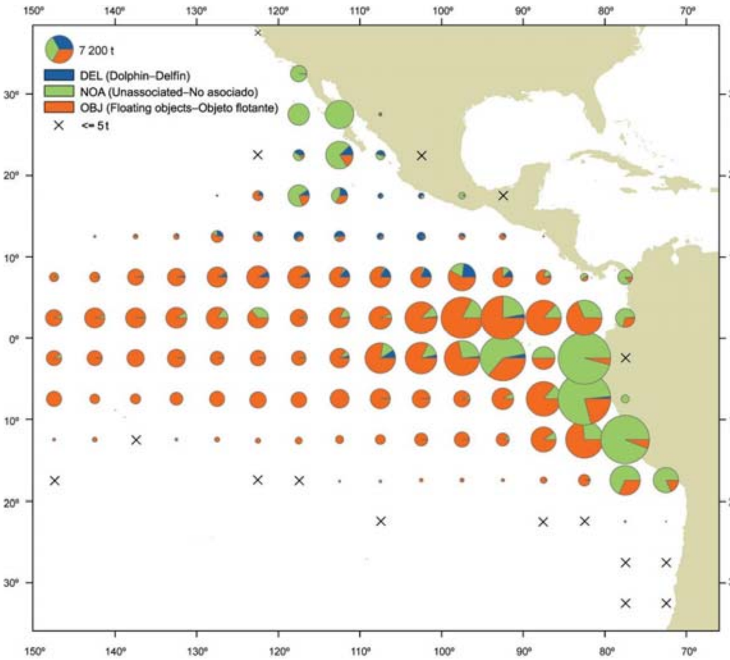

FIGURE 2a. Average annual distributions of the purse-seine catches of skipjack, by set type, 1998-2007. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas.
FIGURA 2a. Distribución media anual de las capturas cerqueras de barrilete, por tipo de lance, 1998-2007. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente.

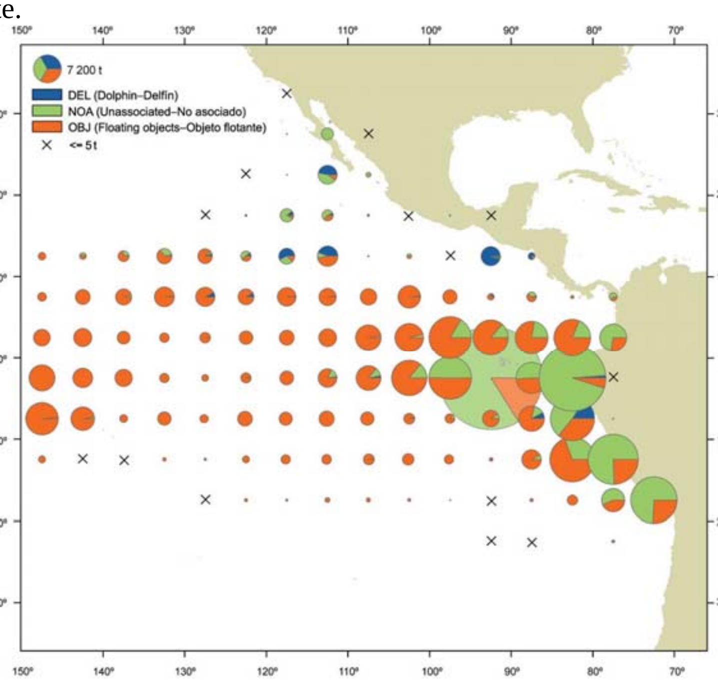

FIGURE 2b. Annual distributions of the purse-seine catches of skipjack, by set type, 2008. The sizes of the circles are proportional to the amounts of skipjack caught in those 5° by 5° areas.
FIGURA 2b. Distribución anual de las capturas cerqueras de barrilete, por tipo de lance, 2008. El tamaño de cada círculo es proporcional a la cantidad de barrilete capturado en la cuadrícula de 5° x 5° correspondiente.

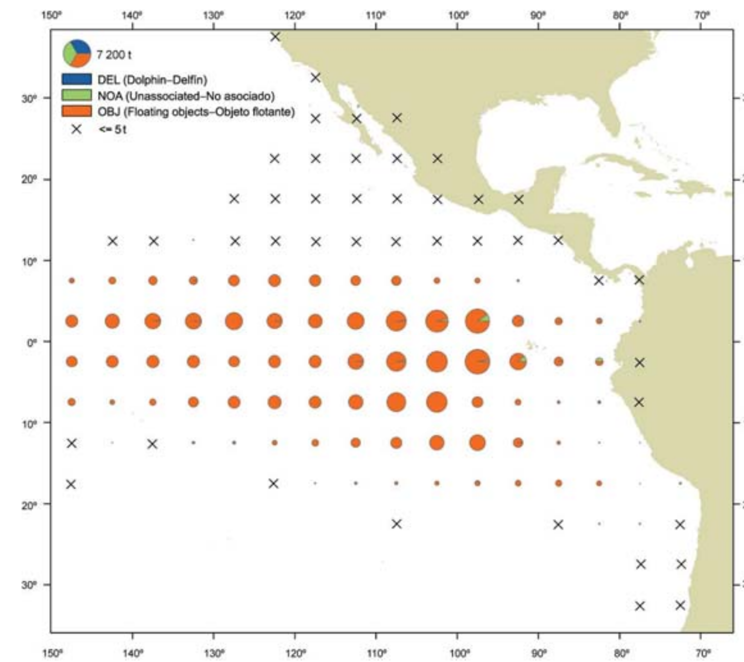

FIGURE 3a. Average annual distributions of the purse-seine catches of bigeye, by set type, 1998-2007. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas.
FIGURA 3a. Distribución media anual de las capturas cerqueras de patudo, por tipo de lance, 1998-2007. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de 5° x 5° correspondiente.

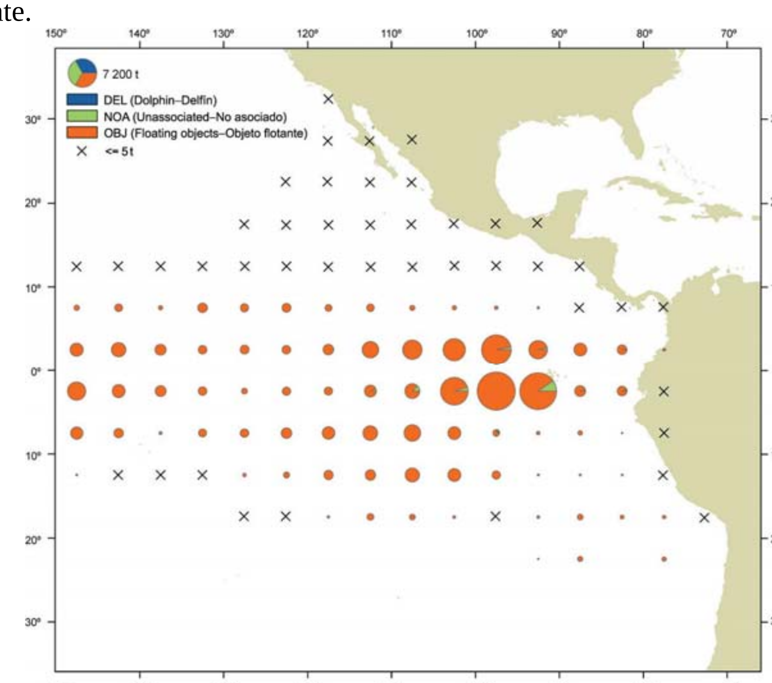

FIGURE 3b. Annual distributions of the purse-seine catches of bigeye, by set type, 2008. The sizes of the circles are proportional to the amounts of bigeye caught in those 5° by 5° areas.
FIGURA 3b. Distribución anual de las capturas cerqueras de patudo, por tipo de lance, 2008. El tamaño de cada círculo es proporcional a la cantidad de patudo capturado en la cuadrícula de ° x 5° correspondiente.

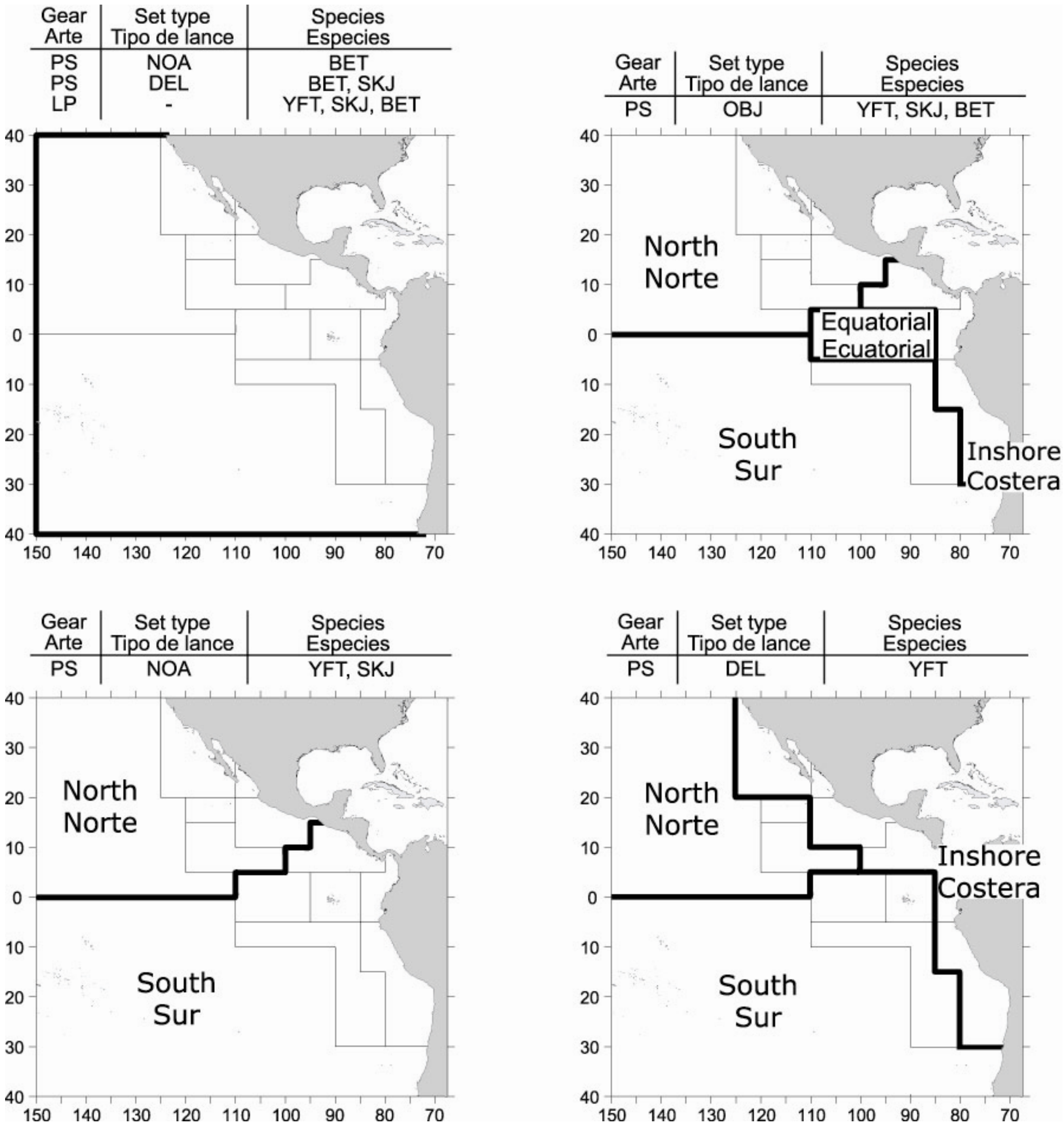

FIGURE 4. Spatial extents of the fisheries defined by the IATTC staff for stock assessment of yellowfin, skipjack, and bigeye in the EPO. The thin lines indicate the boundaries of the 13 length-frequency sampling areas, and the bold lines the boundaries of the fisheries. Gear: PS = purse seine, LP = pole and line; Set type: NOA = unassociated, DEL = dolphin, OBJ = floating object; Species: YFT = yellowfin, SKJ = skipjack, BET = bigeye.

FIGURA 4. Extensión espacial de las pesquerías definidas por el personal de la CIAT para la evaluación de las poblaciones de atún aleta amarilla, barrilete, y patudo en el OPO. Las líneas delgadas indican los límites de las 13 zonas de muestreo de frecuencia de tallas, y las líneas gruesas los límites de las pesquerías. Artes: PS = red de cerco, LP = caña; Tipo de lance: NOA = peces no asociados, DEL = delfín; OBJ = objeto flotante; Especies: YFT = aleta amarilla, SKJ = barrilete, BET = patudo.

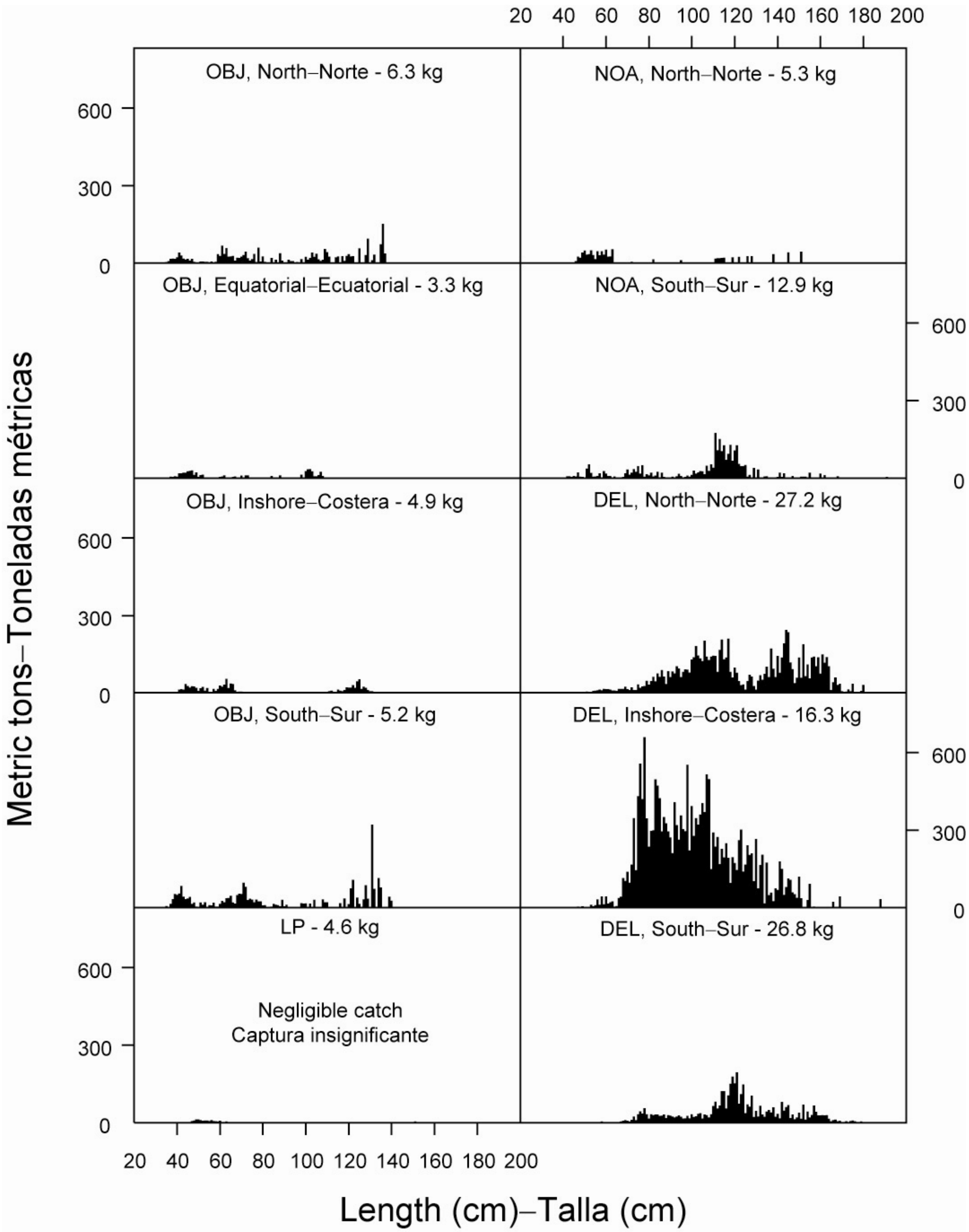

FIGURE 5a. Estimated size compositions of the yellowfin caught in each fishery of the EPO during the fourth quarter of 2008. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 5a. Composición por tallas estimada para el aleta amarilla capturado en cada pesquería del OPO durante el cuarto trimestre de 2008. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín.

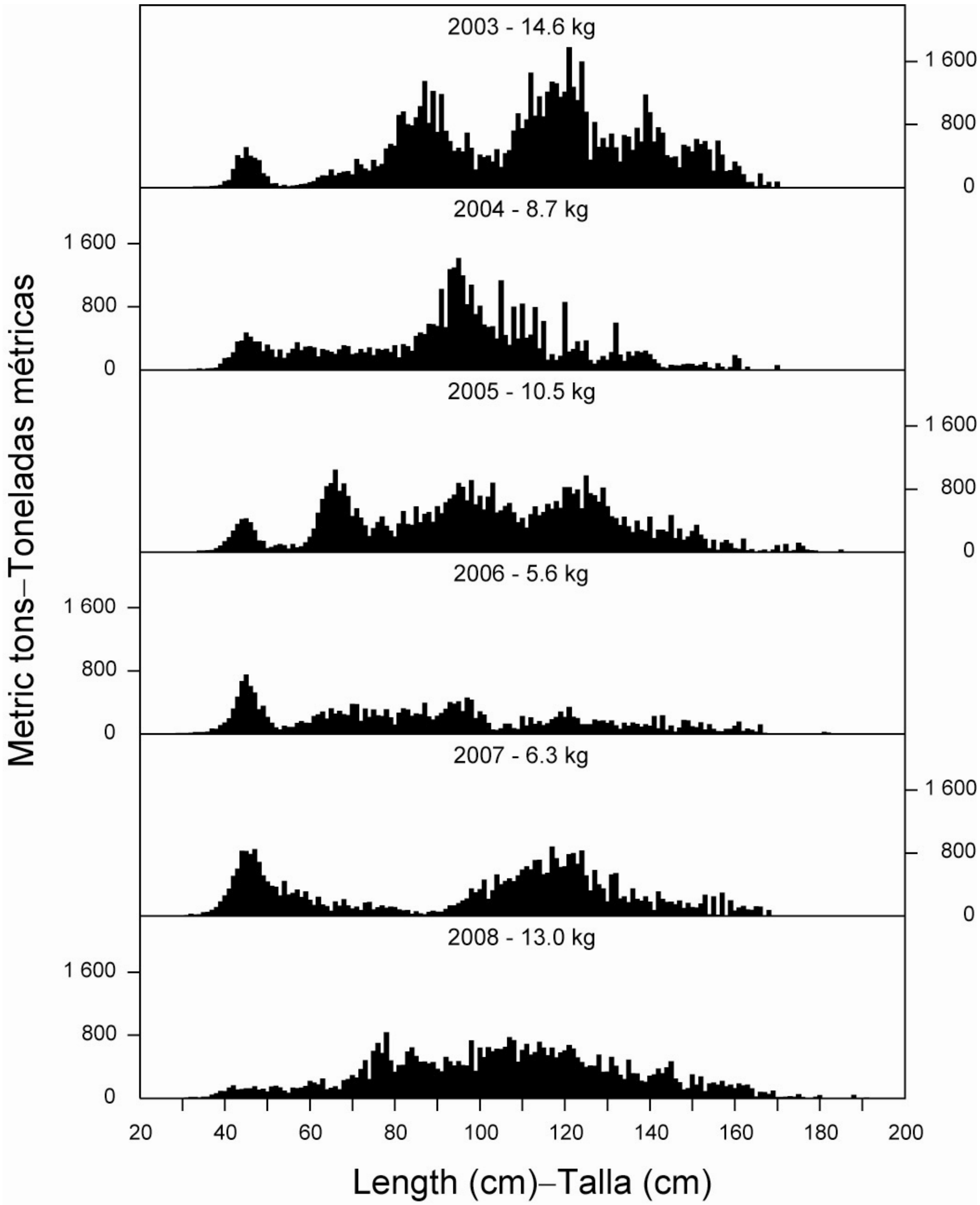

FIGURE 5b. Estimated size compositions of the yellowfin caught in the EPO during the fourth quarter of 2003-2008. The average weights of the fish in the samples are given at the tops of the panels.
FIGURA 5b. Composición por tallas estimada para el aleta amarilla capturado en el OPO en el cuarto trimestre de 2003-2008. En cada recuadro se detalla el peso promedio de los peces en las muestras.

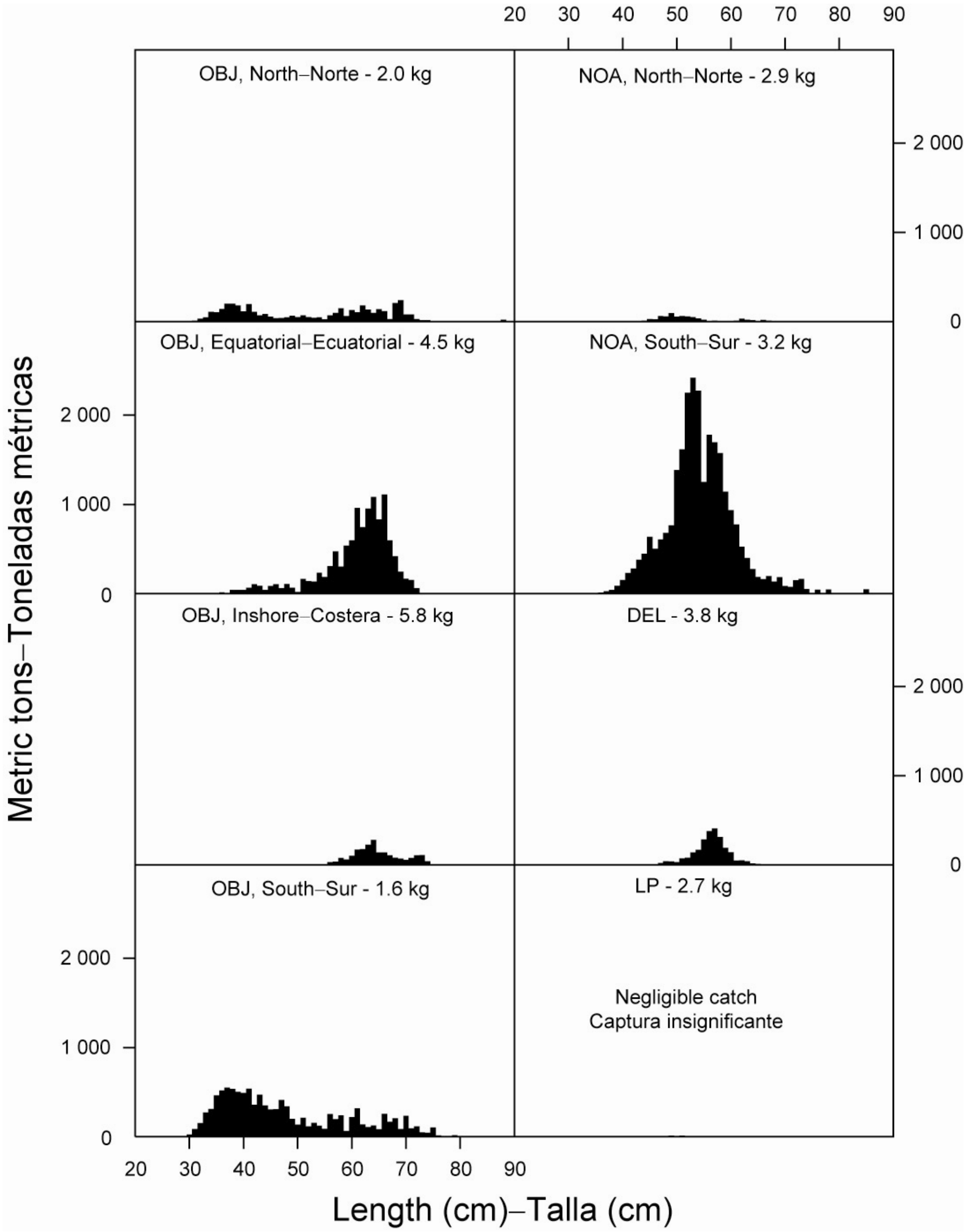

FIGURE 6a. Estimated size compositions of the skipjack caught in each fishery of the EPO during the fourth quarter of 2008. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.

FIGURA 6a. Composición por tallas estimada para el barrilete capturado en cada pesquería del OPO durante el cuarto trimestre de 2008. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín.

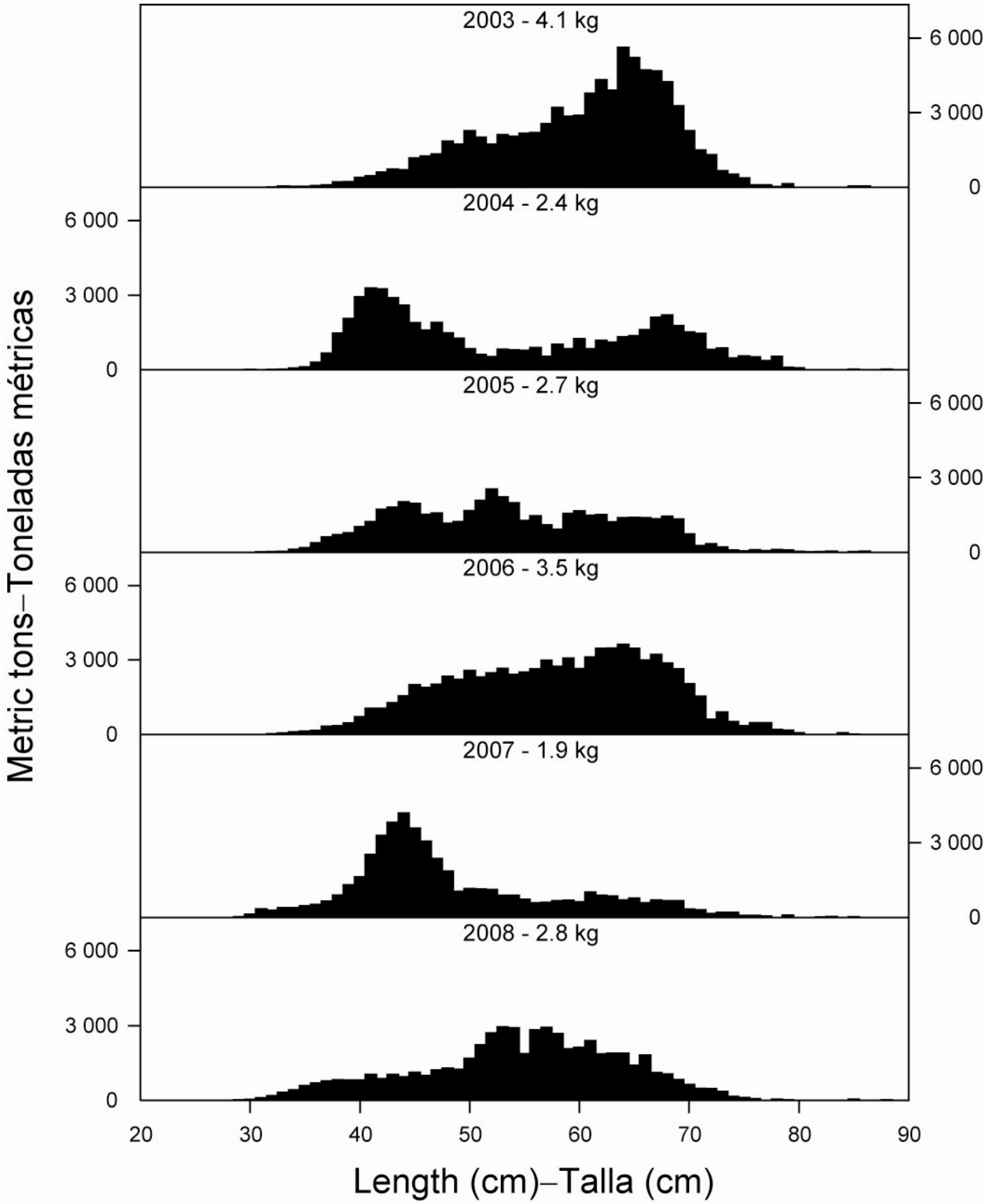

FIGURE 6b. Estimated size compositions of the skipjack caught in the EPO during the fourth quarter of 2003-2008. The average weights of the fish in the samples are given at the tops of the panels.

FIGURA 6b. Composición por tallas estimada para el barrilete capturado en el OPO en el cuarto trimestre de 2003-2008. En cada recuadro se detalla el peso promedio de los peces en las muestras.

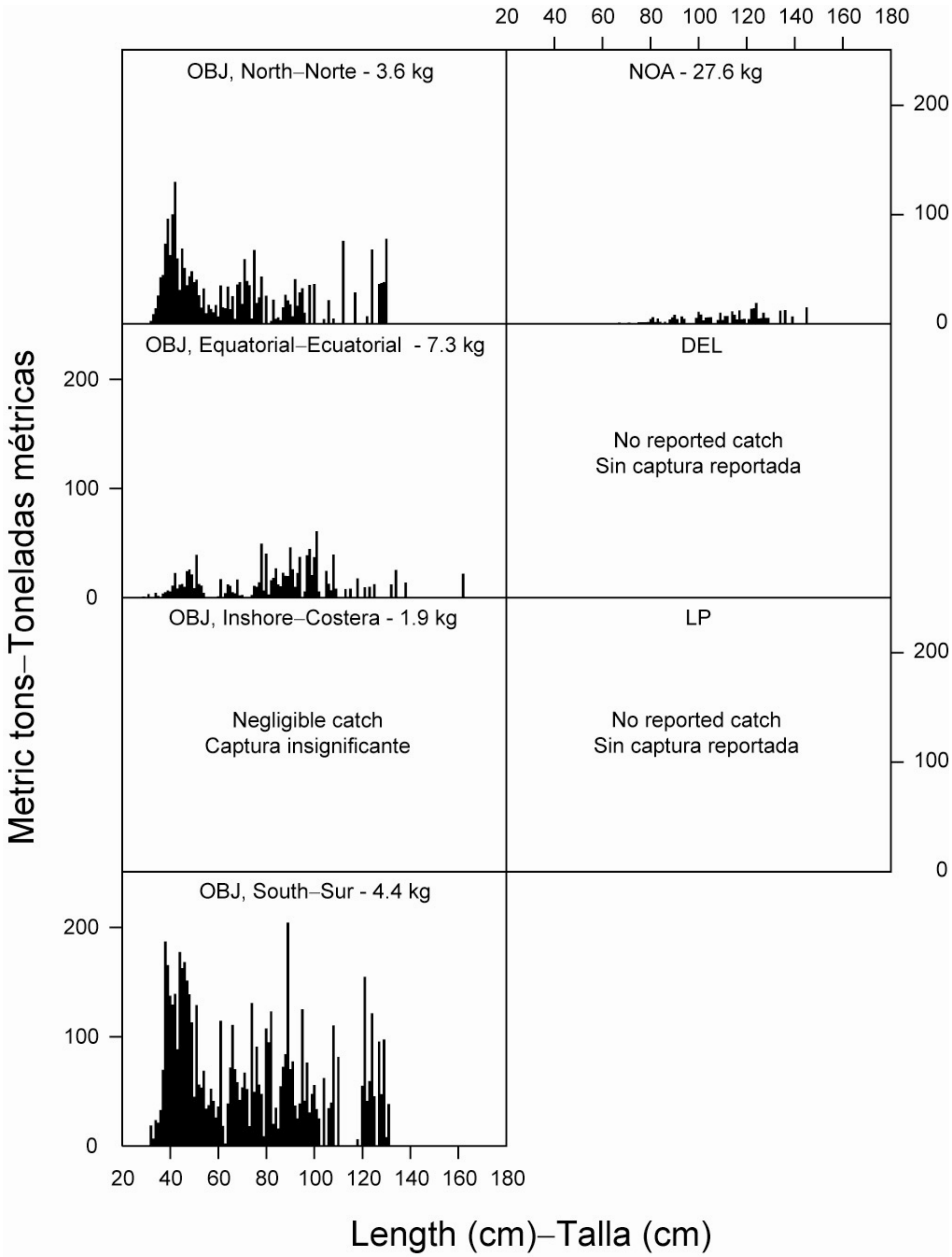

FIGURE 7a. Estimated size compositions of the bigeye caught in each fishery of the EPO during the fourth quarter of 2008. The average weights of the fish in the samples are given at the tops of the panels. OBJ = floating object; LP = pole and line; NOA = unassociated; DEL = dolphin.
FIGURA 7a. Composición por tallas estimada para el patudo capturado en cada pesquería del OPO durante el cuarto trimestre de 2008. En cada recuadro se detalla el peso promedio de los peces en las muestras. OBJ = objeto flotante; LP = caña; NOA = peces no asociados; DEL = delfín.

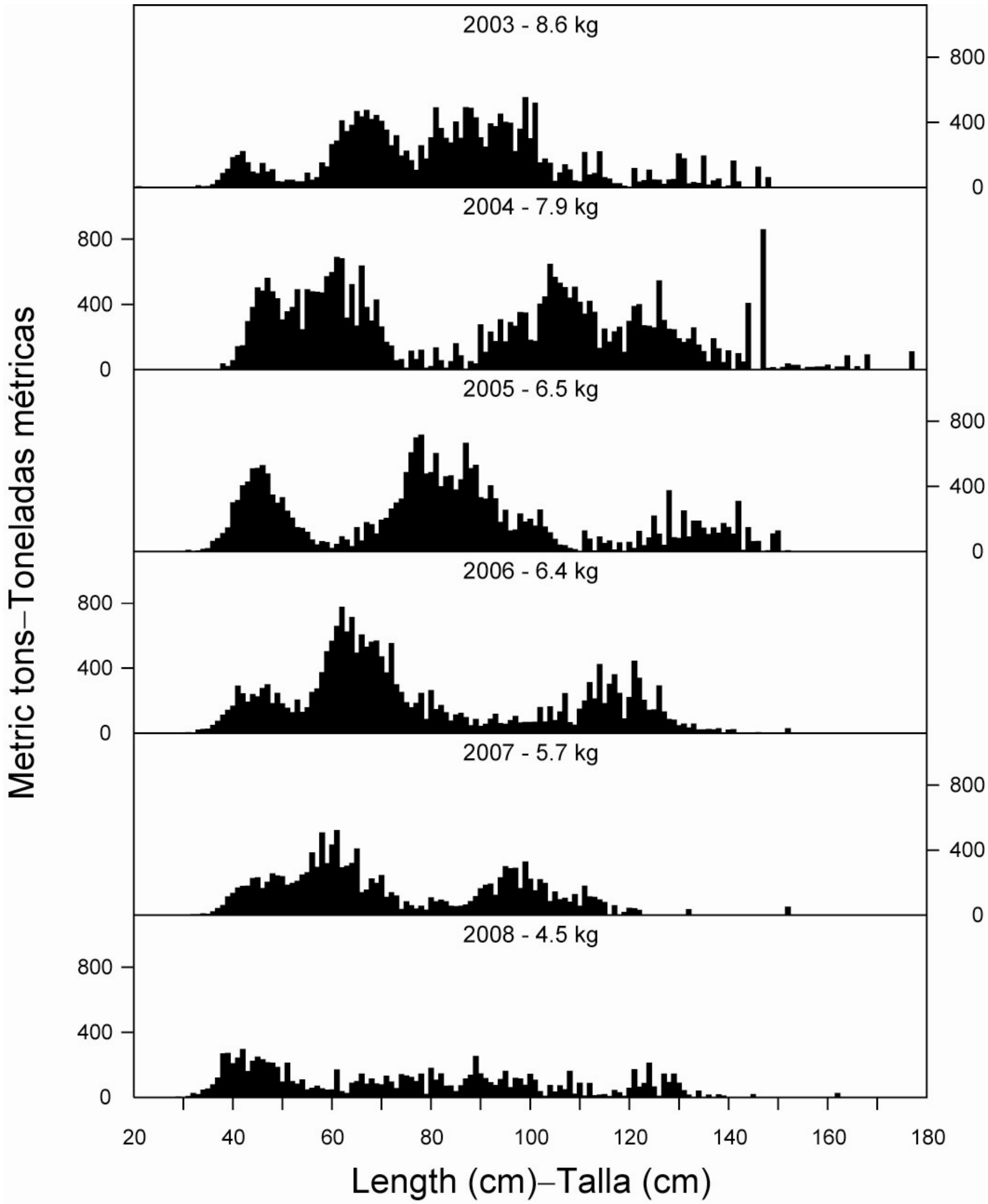

FIGURE 7b. Estimated size compositions of the bigeye caught in the EPO during the fourth quarter of 2003-2008. The average weights of the fish in the samples are given at the tops of the panels.
FIGURA 7b. Composición por tallas estimada para el patudo capturado en el OPO en el cuarto trimestre de 2003-2008. En cada recuadro se detalla el peso promedio de los peces en las muestras.

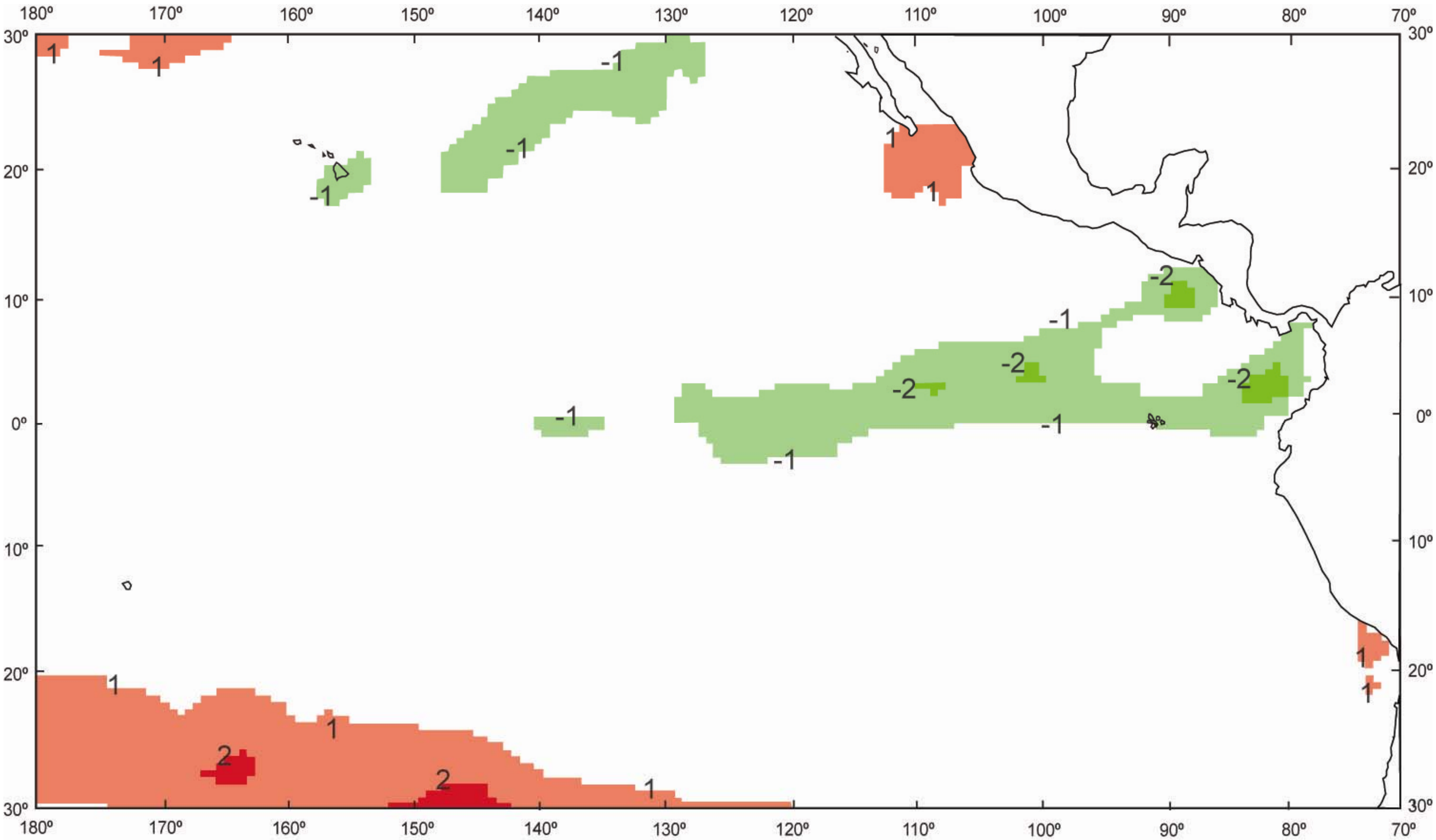

FIGURE 8. Sea-surface temperature (SST) anomalies (departures from long-term normals) for March 2009, based on data from fishing boats and other types of commercial vessels.
FIGURA 8. Anomalías (variaciones de los niveles normales a largo plazo) de la temperatura superficial del mar (TSM) en marzo de 2009, basadas en datos tomados por barcos pesqueros y otros buques comerciales.

TABLE 1. Preliminary estimates of the numbers and capacities, in cubic meters, of purse seiners and pole-and-line vessels fishing, or expected to fish, in the EPO in 2009 by flag, gear, and well volume. Each vessel is included in the totals for each flag under which it fished during the year, but is included only once in the fleet total. Therefore the totals for the fleet may not equal the sums of the individual flag entries. PS = purse seine; LP = pole-and-line.
TABLA 1. Estimaciones preliminares del número de buques cerqueros y cañeros que pescan, o que se espera pesquen, en el OPO en 2009, y de la capacidad de acarreo de los mismos, en metros cúbicos, por bandera, arte de pesca, y volumen de bodega. Se incluye cada buque en los totales de cada bandera bajo la cual pescó durante el año, pero solamente una vez en el total de la flota; por consiguiente, los totales de las flotas no son siempre iguales a las sumas de las banderas individuales. PS = cerquero; LP = cañero.

Flag	Gear	Well volume–Volumen de bodega				Capacity
Bandera	Arte	1-900	901-1700	>1700	Total	Capacidad
		Number—Número				
Bolivia	PS	1	-	-	1	222
Colombia	PS	4	10	-	14	14,860
Ecuador	PS	61	14	9	84	60,453
España—Spain	PS	-	-	4	4	10,116
Guatemala	PS	-	1	1	2	3,575
Honduras	PS	1	1	-	2	1,559
México	PS	16	32	1	49	51,968
	LP	4	-	-	4	380
Nicaragua	PS	-	5	-	5	5,986
Panamá	PS	4	17	3	24	31,066
Perú	PS	2	-	-	2	1,000
El Salvador	PS	-	1	3	4	7,415
USA—EE.UU.	PS	-	1	2	3	5,315
Venezuela	PS	-	19	2	21	29,369
Vanuatu	PS	1	2	-	3	3,609
Unknown—Desconocida	PS	-	1	-	1	1,281
All flags—	PS	90	104	25	219	
Todas banderas	LP	4	-	-	4	
	PS + LP	94	104	25	223	
		Capacity—Capacidad				
All flags—	PS	40,763	133,035	53,996	227,794	
Todas banderas	LP	380	-	-	380	
	PS + LP	41,143	133,035	53,996	228,174	

TABLE 2. Changes in the IATTC fleet list recorded during the first quarter of 2009. PS = purse seine.
TABLA 2. Cambios en la flota observada por la CIAT registrados durante el primer trimestre de 2009. PS = cerquero.

Vessel name	Flag	Gear	Capacity (m^3)	Remarks	
Nombre del buque	**Bandera**	**Arte**	**Capacidad (m^3)**	**Comentarios**	
Vessels added to the fleet—Buques añadidos a la flota					
New entry—1[er] ingreso					
Reina De La Paz	Guatemala	PS	2,100		
Aleshka	Perú	PS	458		
Re-entries—Reingresos					
				Now—Ahora	
Mar Cantabrico	Bolivia	PS	222		
Manuel Ignacio F	Ecuador	PS	644		*Ginno D*
Gabiero	México	PS	1,118		
Falcon	Venezuela	PS	1,060		
Changes of name or flag—Cambios de nombre o pabellon					
				Now—Ahora	
Ile Aux Moines	Ecuador	PS	818		*Ricky A*
Vicente F	Guatemala	PS	1,214	Nicaragua	
Pendruc	Nicaragua	PS	1,251	USA—EE.UU.	*Cape Hatteras*
Cape Breton	Panamá	PS	2,032	USA—EE.UU.	
Cape Ferrat	Panamá	PS	2,032	USA—EE.UU.	
Vessels removed from fleet—Buques retirados de la flota					
Betty C	Ecuador	PS	1,010	Sank – Se hundio	
Aguila Descalza	México	PS	493	Sank – Se hundio	
Azteca 11	México	PS	493		
San Uriel	México	PS	296		
Donna B	USA—EE.UU.	PS	170		

TABLE 3. Preliminary estimates of the retained catches of tunas in the EPO from 1 January through 29 March 2009, by species and vessel flag, in metric tons.
TABLA 3. Estimaciones preliminares de las capturas retenidas de atunes en el OPO del 1 de enero al 29 de marzo 2009, por especie y bandera del buque, en toneladas métricas**.**

Flag	Yellowfin	Skipjack	Bigeye	Pacific bluefin	Bonitos (*Sarda* spp.)	Albacore	Black skipjack	Other[1]	Total	Percentage of total
Bandera	**Aleta amarilla**	**Barrilete**	**Patudo**	**Aleta azul del Pacífico**	**Bonitos (*Sarda* spp.)**	**Albacora**	**Barrilete negro**	**Otras[1]**	**Total**	**Porcentaje del total**
Ecuador	3,945	34,616	5,618	-	-	-	-	-	44,179	31.4
México	29,823	1,573	440	-	-	-	507	-	32,343	23.0
Nicaragua	1,439	1,604	260	-	-	-	-	-	3,303	2.3
Panamá	8,345	9,134	1,321	-	-	-	-	80	18,880	13.4
Venezuela	5,991	9,463	11	-	-	-	-	1	15,466	11.0
Other—Otros[2]	10,103	14,914	1,696	-	-	-	-	-	26,713	18.9
Total	59,646	71,304	9,346	-	-	-	507	81	140,884	

1 Includes other tunas, sharks, and miscellaneous fishes
1 Incluye otros túnidos, tiburones, y peces diversos
2 Includes Bolivia, Colombia, El Salvador, Guatemala, Honduras, Peru, Spain, United States, and Vanuatu; this category is used to avoid revealing the operations of individual vessels or companies.
2 Incluye Bolivia, Colombia, El Salvador, España, Estados Unidos, Guatemala, Honduras, Perú, y Vanuatú; se usa esta categoría para no revelar información sobre faenas de buques o empresas individuales.

TABLE 4. Estimated retained and discarded catches, in metric tons, by purse-seine and pole-and-line vessels of the EPO tuna fleet. "Other" includes other tunas, sharks, and miscellaneous fishes. The data for 2007-2008 are preliminary. Discard data were first collected by observers in 1993.

TABLA 4. Estimaciones de capturas retenidas y descartadas, en toneladas métricas, de buques cerqueros y caneros de la flota atunera del OPO. "Otros" incluye otros atunes, tiburones, y peces diversos. Los datos de 2007-2008 son preliminares. Los observadores toman datos sobre descartes desde 1993.

Year	Yellowfin			Skipjack			Bigeye			Pacific bluefin		
	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Año	Aleta amarilla			Barrilete			Patudo			Aleta azul del Pacífico		
	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total
1979	175,439	-	175,439	140,041	-	140,041	12,097	-	12,097	6,107	-	6,107
1980	144,523	-	144,523	136,137	-	136,137	21,938	-	21,938	2,909	-	2,909
1981	169,711	-	169,711	125,071	-	125,071	14,921	-	14,921	1,085	-	1,085
1982	116,293	-	116,293	104,259	-	104,259	6,981	-	6,981	3,145	-	3,145
1983	87,936	-	87,936	61,238	-	61,238	4,614	-	4,614	836	-	836
1984	138,776	-	138,776	62,743	-	62,743	8,863	-	8,863	839	-	839
1985	212,529	-	212,529	51,775	-	51,775	6,058	-	6,058	3,996	-	3,996
1986	263,049	-	263,049	67,555	-	67,555	2,686	-	2,686	5,040	-	5,040
1987	267,115	-	267,115	66,252	-	66,252	1,177	-	1,177	980	-	980
1988	281,016	-	281,016	91,438	-	91,438	1,540	-	1,540	1,379	-	1,379
1989	282,141	-	282,141	97,874	-	97,874	2,030	-	2,030	1,108	-	1,108
1990	265,929	-	265,929	75,192	-	75,192	5,921	-	5,921	1,491	-	1,491
1991	234,113	-	234,113	63,945	-	63,945	4,901	-	4,901	419	-	419
1992	231,910	-	231,910	86,240	-	86,240	7,179	-	7,179	1,928	-	1,928
1993	224,443	4,741	229,184	87,602	10,682	87,602	9,657	648	10,305	580	-	580
1994	212,033	4,532	216,565	73,366	10,526	73,366	34,899	2,271	37,170	969	-	969
1995	216,702	5,275	221,977	132,300	16,373	132,300	45,321	3,251	48,572	629	-	629
1996	242,369	6,312	248,681	106,528	24,503	106,528	61,311	5,689	67,000	8,223	-	8,223
1997	249,296	5,516	254,812	156,716	31,338	156,716	64,272	5,402	69,674	2,609	3	2,612
1998	259,044	4,698	263,742	142,315	22,644	142,315	44,129	2,822	46,951	1,772	-	1,772
1999	283,703	6,547	290,250	263,609	26,046	263,609	51,158	4,932	56,090	2,558	54	2,612
2000	257,662	6,207	263,869	204,538	24,508	204,538	94,640	5,417	100,057	3,773	-	3,773
2001	386,618	7,028	393,646	144,009	12,815	144,009	61,156	1,254	62,410	1,156	3	1,159
2002	413,457	4,140	417,597	153,919	12,506	153,919	57,440	949	58,389	1,761	6	1,767
2003	381,577	5,950	387,527	275,167	22,453	275,167	54,174	2,326	56,500	3,236	-	3,236
2004	271,481	3,009	274,490	199,192	17,182	199,192	67,592	1,749	69,341	880	19	899
2005	269,420	2,929	272,349	263,080	17,228	263,080	69,826	1,952	71,778	4,743	15	4,758
2006	167,016	1,665	168,681	297,843	12,403	297,843	83,978	2,385	86,363	9,806	-	9,806
2007	171,158	1,946	173,104	208,566	7,159	208,566	63,074	1,039	64,113	4,189	-	4,189
2008	186,658	965	187,623	296,029	9,217	296,029	75,653	2,372	78,025	4,407	14	4,421

TABLE 4. (continued)
TABLA 4. (continuación)

Year	Albacore			Bonitos (*Sarda* spp.)			Black skipjack			Other			Total		
	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Año	Albacora			Bonitos (*Sarda* spp.)			Barrilete negro			Otros			Total		
	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total	Retenido	Descartado	Total
1979	327	-	327	1,804	-	1,804	1,364	-	1,364	558	-	558	337,738	-	337,738
1980	601	-	601	6,125	-	6,125	3,680	-	3,680	442	-	412	316,355	-	316,355
1981	707	-	707	5,717	-	5,717	1,911	-	1,911	216	-	216	319,339	-	319,339
1982	553	-	553	2,122	-	2,122	1,338	-	1,338	47	-	47	234,738	-	234,738
1983	456	-	456	3,829	-	3,829	1,222	-	1,222	60	-	60	160,191	-	160,191
1984	5351	-	5351	3,514	-	3,514	662	-	662	6	-	6	220,754	-	220,754
1985	919	-	919	3,604	-	3,604	288	-	288	19	-	19	279,188	-	279,188
1986	133	-	133	490	-	490	569	-	569	181	-	181	339,703	-	339,703
1987	321	-	321	3,316	-	3,316	571	-	571	481	-	481	340,213	-	340,213
1988	288	-	288	9,550	-	9,550	956	-	956	79	-	79	386,246	-	386,246
1989	22	-	22	12,096	-	12,096	801	-	801	36	-	36	396,108	-	396,108
1990	209	-	209	13,856	-	13,856	787	-	787	200	-	200	363,585	-	363,585
1991	834	-	834	1,289	-	1,289	421	-	421	4	-	4	305,926	-	305,926
1992	255	-	255	977	-	977	105	-	105	24	-	24	328,618	-	328,618
1993	1	-	1	600	12	612	104	4,137	4,241	9	2,022	2,031	322,996	22,242	345,238
1994	85	-	85	8,693	147	8,839	188	861	1,049	9	498	507	330,242	18,835	349,077
1995	465	-	465	8,010	55	8,065	203	1,448	1,651	11	626	637	403,641	27,028	430,669
1996	83	-	83	654	1	656	704	2,304	3,008	37	1,028	1,065	419,909	39,837	459,746
1997	60	-	60	1,105	4	1,109	100	2,512	2,612	71	3,383	3,454	474,229	48,158	522,387
1998	123	-	123	1,337	4	1,341	528	1,876	2,404	13	1,233	1,246	449,261	33,277	482,538
1999	274	-	274	1,719	-	1,719	171	3,412	3,583	27	3,092	3,119	603,219	44,083	647,302
2000	157	-	157	636	-	636	293	1,995	2,288	190	1,410	1,600	561,889	39,537	601,426
2001	160	-	160	17	-	17	2,258	1,019	3,277	191	679	870	595,565	22,798	618,363
2002	412	-	412	-	-	-	1,467	2,283	3,750	576	1,863	2,439	629,032	21,747	650,779
2003	93	-	93	1	-	1	439	1,535	1,974	80	1,238	1,318	714,767	33,502	748,269
2004	231	-	231	16	35	51	884	387	1,271	256	973	1,229	548,532	23,354	571,886
2005	68	-	68	313	18	331	1,472	2,124	3,596	190	1,922	2,112	609,112	26,188	635,300
2006	110	-	110	3,519	80	3,599	1,999	1,977	3,976	49	1,910	1,959	564,320	20,420	584,740
2007	138	-	138	15,954	628	16,582	2,262	1,625	3,887	600	1,221	1,821	465,941	13,618	479,559
2008	10		10	7,072	65	7,137	3,585	2,560	6,145	135	2,026	2,161	573,549	17,219	590,768

TABLE 5. Preliminary estimates of the retained catches and landings, in metric tons, of tunas and bonitos caught by purse-seine and pole-and-line in the EPO in 2008 by species and vessel flag (upper panel) and locations where processed (lower panel). The purse-seine and pole-and-line data for yellowfin, skipjack, and bigeye tunas have been adjusted to the species composition estimates and are preliminary.

TABLA 5. Estimaciones preliminares de las capturas retenidas y descargas de atunes y bonitos capturado por buques cerqueros, cañeros en el OPO en 2008, por especie y bandera del buque (panel superior) y localidad donde fue procesado (panel inferior), en toneladas métricas. Los datos de los atunes aleta amarilla, barrilete, y patudo de las pesquerías cerquera y cañera fueron ajustados a las estimaciones de composición por especie, y son preliminares.

Flag	**Yellowfin**	**Skipjack**	**Bigeye**	**Pacific bluefin**	**Albacore**	**Black skipjack**	**Bonitos (*Sarda* spp.)**	**Miscel-laneous**	**Total**	**Percent of total**
Bandera	**Aleta amarilla**	**Barrilete**	**Patudo**	**Aleta azul del Pacífico**	**Albacora**	**Barrilete negro**	**Bonitos (*Sarda* spp.)**	**Misce-láneo**	**Total**	**Porcentaje de total**
				Retained catches—Capturas retenidas						
Ecuador	18,800	144,058	41,162	-	-	110	23	88	204,241	35.6
México	85,515	21,931	328	4,407	10	3,366	6,969	40	122,566	21.4
Nicaragua	5,831	6,003	846	-	-	3	-	-	12,683	2.2
Panamá	27,152	42,452	11,357	-	-	47	66	4	81,078	14.1
Venezuela	21,257	26,910	3,179	-	-	57	9	3	51,415	9.0
Other—Otras[1]	28,103	54,675	18,781	-	-	2	5	-	101,566	17.7
Total	186,658	296,029	75,653	4,407	10	3,585	7,072	135	573,549	
				Landings—Descargas						
Colombia	27,723	26,579	4,792	-	-	22	-	1	59,117	10.4
Ecuador	38,395	202,425	60,031	-	-	139	94	70	301,154	52.9
México	84,574	26,179	2,026	4,407	10	3,364	6,975	39	127,574	22.4
Venezuela	9,171	13,048	1,568	-	-	52	9	3	23,851	4.2
Other—Otras[2]	23,297	27,037	6,745	-	-	6	-	5	57,090	10.0
Total	183,160	295,268	75,162	4,407	10	3,583	7,078	118	568,786	

[1] Includes Colombia, El Salvador, Guatemala, Honduras, Peru, Spain, United States, and Vanuatu. This category is used to avoid revealing the operations of individual vessels or companies.

[1] Incluye Colombia, El Salvador, España, Estados Unidos, Honduras, Guatemala, Perú, y Vanuatú. Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

[2] Includes Costa Rica, El Salvador, Guatemala, Peru, Spain, United States, and Unknown. This category is used to avoid revealing the operations of individual vessels or companies.

[2] Incluye Costa Rica, El Salvador, España, Estados Unidos, Guatemala, Perú, y Desconocido Se usa esta categoría para no revelar información sobre las actividades de buques o empresas individuales.

TABLE 6a. Catches of bigeye tuna, in metric tons, in the eastern Pacific Ocean during 2008 by longline vessels more than 24 meters in overall length.
TABLA 6a. Capturas de atún patudo, en toneladas métricas, en el Océano Pacífico oriental durante 2008 por buques palangreros de más de 24 metros en eslora total.

Flag	Quarter				Total
	1	2	3	4	
Bandera	**Trimestre**				**Total**
	1	**2**	**3**	**4**	
China	271	120	494	-	885
Japan—Japón	3,729	2,352	3,238	2,619	11,938
Republic of Korea—República de Corea*	783	913	1,202	1,252	4,150
Chinese Taipei—Taipei Chino	697	454	497	338	1,986
United States—Estados Unidos	-	-	-	-	-
Vanuatu	269	166	109	159	703
Total	5,749	4,005	5,540	4,368	19,662

* Round weight obtained by adjustment applied to processed weight—Peso entero obtenido mediante ajuste aplicado al peso procesado provisto

TABLE 6b. Preliminary estimates of the catches of bigeye tuna, in metric tons, in the eastern Pacific Ocean during the first quarter of 2009 by longline vessels more than 24 meters in overall length.
TABLA 6b. Estimaciones preliminares de las capturas de atún patudo, en toneladas métricas, en el Océano Pacífico oriental durante el primer trimestre de 2009 por buques palangreros de más de 24 metros en eslora total.

Flag—Bandera	Month—Mes			
	1	**2**	**3**	**Total**
China	-	-	-	-
Japan—Japón	1,375	1,147	840	3,362
Republic of Korea—República de Corea	-	-	-	-
Chinese Taipei—Taipei Chino	117	90	254	461
United States— Estados Unidos	-	-	-	-
Vanuatu	-	-	-	-

TABLE 7. Preliminary data on the sampling coverage of trips by vessels with capacities greater than 363 metric tons by the IATTC program and the national programs of Colombia, Ecuador, the European Union, Mexico, Nicaragua, Panama, and Venezuela during the first quarter of 2009.

TABLA 7. Datos preliminares de la cobertura de muestreo de viajes de buques con capacidad más que 363 toneladas métricas por el programa de la CIAT y los programas nacionales de Colombia, Ecuador, México, Nicaragua, Panamá, el Unión Europea, y Venezuela durante el primero trimestre de 2009.

Flag	Trips	Observed by program			Percent observed
		IATTC	National	Total	
Bandera	**Viajes**	**Observado por programa**			**Porcentaje observado**
		CIAT	**Nacional**	**Total**	
Colombia	23	12	11	23	100.0
Ecuador	100	64	36	100	100.0
España—Spain	7	4	3	7	100.0
Guatemala	4	4		4	100.0
Honduras	4	4		4	100.0
México	69	35	34	69	100.0
Nicaragua	7	3	4	7	100.0
Panamá	36	18	18	36	100.0
Perú	2	2		2	100.0
El Salvador	10	10		10	100.0
United States	3	2	1[1]	3	100.0
Venezuela	25	11	14	25	100.0
Vanuatu	4	4		4	100.0
Total	294[2]	173	121	294[2]	100.0

[1] One trip by a U.S.-flag vessel was sampled by the national observer program of Panama (PRONAOP). The vessel was registered under the Panamanian flag until just prior to its departure, and a national observer had already been assigned to the vessel.

[1] Un viaje por un buque de pabellón de Estados Unidos fue muestreado por el programa nacional de observadores de Panamá (PRONAOP). El buque estuvo matriculado en Panamá hasta justo antes de zarpar, y un observador ya había sido asignado al mismo.

[2] Includes 65 trips, 40 by vessels with observers from the IATTC program and 25 by vessels with observers from the national programs, that began in late 2008 and ended in 2009

[2] Incluye 65 viajes, 40 por buques con observadores del programa del CIAT y 25 por buques con observadores de los programas nacionales, iniciados a fines de 2008 y completados en 2009

TABLE 8. Oceanographic and meteorological data for the Pacific Ocean, April 2008-March 2009. The values in parentheses are anomalies. SST = sea-surface temperature; SOI = Southern Oscillation Index; SOI* and NOI* are defined in the text.
TABLA 8. Datos oceanográficos y meteorológicos del Océano Pacífico, abril 2008-marzo 2009. Los valores en paréntesis son anomalías. TSM = temperatura superficie del mar; IOS = Índice de Oscilación del Sur; IOS* y ION* están definidas en el texto.

Month—Mes	**4**	**5**	**6**	**7**	**8**	**9**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	25.9 (0.4)	24.4 (0.1)	23.7 (0.6)	22.7 (0.8)	21.9 (1.1)	21.2 (0.7)
Area 2 (5°N-5°S, 90°-150°W	27.2 (-0.2)	27.1 (0.0)	26.6 (0.2)	26.1 (0.6)	25.7 (0.7)	25.1 (0.3)
Area 3 (5°N-5°S, 120°-170°W)	26.8 (-0.9)	27.2 (-0.6)	27.2 (-0.3)	27.2 (0.1)	26.9 (0.2)	26.5 (-0.2)
Area 4 (5°N-5°S, 150W°-160°E)	27.4 (-1.0)	27.9 (-0.8)	28.1 (-0.6)	28.3 (-0.3)	28.2 (-0.3)	28.1 (-0.4)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	15	80	70	35	45	30
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	40	80	70	50	60	45
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	140	140	145	170	125	125
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	200	200	180	170	170	170
Sea level—Nivel del mar, Callao, Perú (cm)	112.4 (-2.1)	115.7 (2.2)	113.6 (1.6)	119.3 (9.2)	106.0 (-1.6)	107.2 (1.2)
SOI—IOS	0.6	-0.3	0.3	0.2	0.8	1.5
SOI*—IOS*	0.21	-4.85	3.56	-3.87	-0.75	0.72
NOI*—ION*	4.41	0.57	1.47	-1.58	-1.44	-0.10

Month—Mes	**10**	**11**	**12**	**1**	**2**	**3**
SST—TSM (°C)						
Area 1 (0°-10°S, 80°-90°W)	20.8 (-0.2)	21.5 (-0.2)	22.4 (-0.4)	24.3 (-0.2)	26.0 (-0.1)	26.4 (-0.1)
Area 2 (5°N-5°S, 90°-150°W	24.8 (-0.1)	24.8 (-0.2)	24.6 (-0.5)	25.0 (-0.6)	25.8 (-0.6)	26.4 (-0.6)
Area 3 (5°N-5°S, 120°-170°W)	26.3 (-0.3)	26.3 (-0.2)	25.7 (-0.7)	25.9 (-1.0)	26.0 (-0.7)	26.7 (-0.5)
Area 4 (5°N-5°S, 150W°-160°E)	28.3 (-0.1)	28.1 (-0.3)	27.7 (-0.6)	27.4 (-0.7)	27.4 (-0.7)	27.8 (-0.3)
Thermocline depth—Profundidad de la termoclina, 0°, 80°W (m)	45	35	20	20	10	10
Thermocline depth—Profundidad de la termoclina, 0°, 110°W (m)	45	35	20	25	25	70
Thermocline depth—Profundidad de la termoclina, 0°, 150°W (m)	120	140	125	140	130	130
Thermocline depth—Profundidad de la termoclina, 0°, 180°W (m)	170	165	180	180	180	190
Sea level—Nivel del mar, Callao, Perú (cm)	104.7 (-1.0)	101.8 (-5.1)	97.8 (-10.8)	107.7 (-3.8)	110.2 (-3.7)	113.7 (-1.0)
SOI—IOS	1.3	1.5	1.5	1.2	0.8	-0.1
SOI*—IOS*	4.73	2.60	3.97	3.18	3.66	1.06
NOI*—ION*	2.20	2.52	4.22	6.76	-1.16	4.57